

## FIGURE 1A

The Small Island: 10848bp (SEQ ID NO: 1)

**FIGURE 1B**

GGTGAAGTCAGGGCATCTGGAGGCCAAAAGAGGGATGTTGAATCCTCGCGACTTCTAGCCAAGAGTCCTCGTGGC  
 GCGACGCTAGAGATCCTTGCTAGCCAGTCTATCGCCGACAGCAACGTTCTCGTGGCCATGCCCTCAAGCTTCACGC  
 TTCGTCCTGCTGGTTCCGGATGCGAGGGTCGGGTCTGCTGTAATGCCCTCGACTGCGGTGTCATGTTCTGTA  
 AGCGTCCCCGGAGGCACATTGCGATGCGCTAAGCTGTAATCCTTAGGATTGAGGTCTCAGCATGGAATGCCACGTTCG  
 TCCCGCCAGAGCAGAGATGCGAGCAGCGATAAGCTGCTAGTTATAGCCGCCCTCGCTGAGTCAGGAAATTACAGGACTATC  
 CGCCTGATGTTGATCGCTAGGTTGAGCAGAGCTTCTCTGAGGCCATCACACACAGCTACGAAGCGTAGGGCTTCTC  
 GTAGCCCTATTGGGCCAAAATTGGAAGCTGGCCACTGGCGTCTCGACGGTGACGCTGCTGAGAAGTGTGTTGACCCAGC  
 TCACAGAAGGGCGTATCGGGGCAATTGATGATGTCATTACATAACTCTGCGAGCCGGAGTTGGAGCTGTAC  
 GTGTGCCATCTGCTGATTACAGCTGAAAGGTTTATACCGCATTGGGTTACAGGAAATTCCGGACAGGTTTCAATGGGGC  
 GAGCGCACCATCGTTATGGAGAAGGGCTGAGGATTATTCCAGACTTACCCACTTACGGCAACAAATCAGTGT  
 CTCACTGGCCCGTGGCCAGCCGCTAGCACATCTTGAGAGATAGGCATACGGATCATGCCATTACACGCGCC  
 ACTAGATCAGGCTCATGATTGCAAGCCGCCCTTACACTGCGCAGCAGGCCAAACAGCCAGTTGCAAGGCCAGC  
 GCCCATGCCGTATTGGTCTCGACCTGATTGATGTCAGGCTGCTTACAGCTGCGCAGCAGGCCAAACAGCCAGTTGCAAGGCCAGC  
 CCAGCCTTCAGGCTGTAATGAGGGCTTGGGCTGGCTGATCAGCCACAGACATAGGCCCGTGGGTTTCTCTGCCCTGGCGCAAG  
 CATGCGAGGTTGAGGATCGGCCAATTCTGCTGATTGCGCTCTGCTCATGTCAGGCTGCAACAGGCTGAA  
 CGTTGACCTCGTACAAGCCGCTGATCGAGTGCAGGGCTGTTACCGCAGCTGCTGAGTGTGTTGCAACGTGCAAATCAA  
 GAACTGCGCCGGCGTGGCCATGAGCCGATTCTAGTGTGCTTGTGCAACAGGCTTGTAGGCCAGCGAAGTGT  
 CGCAGACAGCTGCCAGTCAACCCAGGAAGTTGCGCAGTGTGCCAGCAGGGCTGGGCTGAAAGTGTAAACC  
 ACCGCTTGTAGCCCTGAAAACGGCTGCTGCTGTAACGCCAGACATAGGCCCGTGGGTTTCTCTGCCCTGGCGCAAG  
 CATTGCAACGGTGTGTTCATCGCGCTGATCAGCCCTGGTTACCCAGCGCTTACCGCAGTGTGCAACAGGCTGAA  
 GCGCAGCCGGTTGTCGAGCCGAGGGTGCAGCGCAATTGCCAGCCGGGCAAAGATTGCGGCTTCTCC  
 TGCCGTAAGCGCGCAACTGATCGGAAACTTGGGACCATCTGGGCCACCATCAGCTGGGCAAAACCTGCGTGGGATACCTTGTG  
 GATTGACCTGCCCTGATTCTAGTACACGCTGAACTTAGTGAATCCGTTTCAAGCAGGAGACGGCAGTGCAGAAG  
 CGTTCTTCGACTTCTCAAGCGGCTGAGGCTAGTGTACCGCAGGCTGACGCCAACCTGGTGAACGGCCAG  
 AGTATCGAGCTGTAACGCGCTGCACATCTGCTGTGGCTGAGGTCAACCACAAGGGATTACCGGCTGTA  
 CCGAGCCCGGGCTTGTGAGGGCGGAGGGTGCAGCGCGGAATGCCCTGAGCTGAGGCCACCGAAC  
 AGGTTCTGCGATGGGATTTCGCTCTGACGCCAGCGACTGCACTGCCAGGCAACATGCTGAGGTGGTGGTGTGACTTC  
 ACCAAGGTGCGGATCTGGGACTACGGTACCGGTTACGGTACCGGCTGTTCTGTCAGCGGTTTCTGTCAGCGGGCTGGGAGATGGCG  
 GTTTCGCGCTACCCGAGCGATCCGACCGGAGGGCCAGTCCACGGGCAAGGGCTTGTGATCAGTGGGCTGTC  
 AGCGTACATCAAGTGAAGCTGATTAGCCCTGAGGCTGAGGCTGAGGCTTACATCGACTCATTCAACCGCAAGTTC  
 CGGGCGGAATGCCCTAAGGACTGCTCGTGGTCAAGGCCAGAATCCGTATCGGGCTTGGGGATTACAACGAGCA  
 CCGACCAACAGGCCATTGCAATCTCTCCCGCAGAGCTGCGAAGTGGGAACCAACAGCAGCAGCTGAAGC  
 GGGAAAAGTTGATATCAACCCCATAGGCCACTAACTAGGCAGGGCTACTAAACACTGGGGCAGTCCGAACTGATA  
 AAAAACCTGCCAAACTGGAAAACCTTGTGCGGTTTCTAATATTGCTCGAACCCCTGGTATTTCAGGAGGCGA  
 ACATGCAATCTCAATCTGGGCTACTGCGCTCTGCTGAGGCTGCAATGGGCTGCAACCCGTCGAGGCCCAT  
 AAGTCCGCCAGCTTGGCTCAGGGACCTTCAGGGCAAGGTCTGGGTTGCCCTAAAGAGCACCCGGGAATACTTCCG  
 GAAGTTGCCGAAAGCGTAGCGACGTCGTTTCAAGCTGCCCCAGGGCAAGGGGAGTCCGACTCTGACTGACTCG  
 CAGGGCCGGCAGATCAGTCTGCCAGTTGAGAACGGAGTCACCGAGCTACAGCTCAGTGGCCACCATGACCAGT  
 CTGGCTCTAAGCGCGTGGGCTGCAAGGCTGCGCAGTACCCGGAGCAATGCTGCGTAGAGAGAGAAAGGCATGCTCGA  
 TGGCATCCGCGAGCATGCGGTTCTGCCGCTGGGGCATACCCGGGCTTCTGGGCTCAGGTATGAGGCCGGCG  
 TCAAGACCTTCTGCAAGATGATCTTATTCGCTGACAGCTGCAACAGCTGCAAGCTGAAAGCTGAGCTTCAACACATT  
 AGCAGCGAGATCGGCCATCGTCAAAAGGGCTGGCAACAGATCGCGCTCTCTGAGTTGCTGCTCAATGTACT  
 CCCACGCATAGATTGCGGGCTGAGCCCCTAGAACGCCTATTGCGCAGGAGACACGCAAGCCGTGCTCCGACAGATCG  
 CTACGCATCCAGAGGTTGACGCCAGCGGACCGTTGCCCATGCCAGCAGATTGCACTGCGCTCCGGAGTCACCTT  
 GGCAGATCTAGCTGGTTGAGTGTCTACATTCCCGAGATTAAGACGCTGAAACATCACAGGTACGCCATGTTGAGGGCG  
 TCCGCAATTAGTGGCTGTCATGCCAGCCACACCCGGATCTGGAGGTGCCAGCATATCTCCGGTCTTCC  
 CAGGAGTGTCTGCAAGAGCTGAGCTGAGTGTGATCAGCGCTTACCGGCCGGCTAGAGTGGAGAATTCAGGATGGCG  
 GTGATGATTAACGTCGGCTCCCTGAGATGATCGACAAGAATTTCAGCGGCAACTGGGCTGCAACGACAACCTGAT  
 CTTGAGTCTGAGGGCGAAGCTGGGGAGGTAGCCCGGACCGAGCTACTAGGGGGCGCGCTCAAGGGCTGGGCTGCG  
 GGGTGCCTGCCCTGCAAGGGCGGAAATGCTGCACTGAGCTGAGGGCTGGAGGAATTGCGCAGCAAACCGTGTGGTGC  
 TTGAAGAGCGAGCGCGTGATTTCAGTGGCATGCTCGTGGCACCTGAACTTCACCATGCCGAGGAGATCAAGGGCG  
 TCTTCAGGAGCGCCTCAGGAGCGAGTCGGTGAACATCTGGAAACAGTCTTCAAGCTCAGAGCGTCATACCTCGCTT  
 CTCTCGACGAGGGCGTCTGGCAGTCTGATGAGTATGCTCAGCTGCTCAACAGAACCCGGAGATCACAGACGG  
 GCGGTGGCTTCTGCCAGAGGGCGGAGTGCCTTACCGAGCTGACTGCTGCTATCGTGTGCAATGGCTTGGCG  
 TAGGCTCAAGTGGAGGCTATGCCCTCGCTTACAGCTGAGTGTGCTGAGATACTCGGAACGCCATAG  
 GGTGCGAGCTGAGTGAACCATGCTGATAACGTTGATCATCAGCAGTTACTCGTGTGCTGCCATGCCGGCAGACGGTGCAG  
 TCGCCGGTCTGCCGCTGCGTTAGCAGAGGCCAGCGCCGAAAGTGGCGGTTATTGCCAGAAGACATTGCTAAGGAAGT  
 TATCTTCCCTCTCTGATCGCCCTGCCAGCCGATTCCAACGCTGAGTGTGCTCTGCTCAACAGAACCCGGAGATCACAG  
 ATGCCACAGCTGGCGGAAATCAATCAAGCGCTGAAACGATATCTCTGACAAACTACTCGGCAAGGAGGCTTCTGCGTTTC  
 GGCAACCCCTGAGTCTGACTACCGTTGAGCTGAGGCTAAGGCTTGGGAAATAAGGAGTTCACTGATTGATACATGGCTG  
 GCACAGTGGGCTTGTAGAGACTTCCCTGAGCAACGATGCCACGTTGCCGGCTGCAACCCGGAGAGGGACCGGAACCTGGTAT  
 GGAGCGCTCGAGGGGGTTGGCTTCTGCTGAGGTTGGGACTTGTGCTTCAAGGGTTACCGCTGGGTGATCTTGC  
 AATTGTTACAAGTGAACCTCCATTCTCATCTTGGCACCGGAGAAACTTGGCCGGAGCAGTGGCTGAGACTTGTGCTC  
 TGGGCTGAGGACGCTGATGGCGTTGAGCATGTTGACTGAAACGCCAGTGGCTGGGGAGGACATTCA  
 ATTAGTGCCTATTGCTAGAGGCCAGCTGCAAAATCCGCACTGGTAAATTCTCTAATAGATGGGCCACCCGAAGGTGGCTATC  
 AAGGGGAAGGAGCGATACTGCCAATAAAATCCGCACTGGTAAATTCTCTAATAGATGGGCCACCCGAAGGTGGCTATC  
 TGTGCTGCAATGAGTTGCTGCGCAACACCCATTCTACCGAGGCCATCTGGTCAACGAGGCCAGGGCCCTCGAG  
 GTGGGCTTCTGTTCTGGAGTCTGGGATATCTGATCACGCCAGCGCCAGAACAGAGCGCTGGTTCTGCTGCTTCC  
 TTATATCGGCACTGCCACATTGCTGCGCTGCCAGTCTGTTCCAT

## FIGURE 2A

## The Big Island: 84830bp (SEQ ID NO: 2)

FIGURE 2B

TGGATATTCGCCCTGAGCGTGTGACGCTGATATTGGTACCCGAGGCCGAGCGCTGATCGCTTGCTGAAGGGTG  
TCTGCTGTTAGTTGCGCACATTGAAGTCGGCTAAACTTTTCGTCCTTGGCAGAGTGTGAGGGCTAGTAGGGT  
GCTTATTAACCGCTGCGGTATTGACGCTAATGGATGTTGGCTTCTGCGCGCTAAAGCTTGAATGTTGTT  
TTGAAGTAAGTTGAGGCCATTGAACCTCGCGCTGAATGTTTGTCTGCACTGCTGATGAATAGTTGAAGAAGGGCG  
GTTATATTGCCCTGTGCGTATGACGCTTATGCTGTTGCTTCTGCCATTACTGCTTAAGTAGGTTGCTC  
GCTGCTGAGTTGGGCTCATTGAATTCTGCCCTAAATTCTTGACTGCTGCTGCTGAGTATTGCGGAAAGAAGTGTGTT  
TTATATTAATGGCTGTGCGCTATTGTTGAGACTCTGGTAGTGTGATCTGCTGCTGAGTTATGACTTGTGAGGTTGTTA  
GCAGCTAGCTCTGCCGTTGAAAGTTGAGGGTTTGTGCTGAGTTGCTGCTGAGTGTGCTGAGGTTGTTGCTGAGAAGAGTT  
TATATTAATGCTGCGCTTGTCTATGCTGATGCTGTTGATTTCTGCTGTTGATAGGGCTCTAGCATGTTGCTG  
GATTAGAAGGCCCTGGTCAAATCAAGGATAAGTTCATCTAATGCTCCGCTGTGACCTAACGTTAAAGTCTTGGTGT  
GACTACTCCCTAGGCTGAATGAGTTGGTACAACATCTTCTGCTTATGCTAATATCAGCATTGCTGACCAATATC  
ATTTTTGAGTCATTTCAGCTAGCTAGTATCTGCTCTCAGTTCTGCTGCTCACGTCACCGCTGATGACAGC  
ACCAGGCTGTTGATGGCAAGGATCTTCATGCCGGTCACTGCGACGTAAGTCAAGGTTCAACTCATGCTGCCGTTGCC  
TGGGTCGGTGTGCCGGGCCAGCGGGTCCGCGTGAAGTCGCTGACAGGCAAACGAAATCCATTCCAGCCCCCTTGGCCT  
TGTGCGGTGGTCAAGGGTATTGTTGCTCAGTCATGCTCAAGGGTCAAGTCAGGCAAGCTCAAGGATCCGCGCAGGC  
AGATCAGGGTAGGTCGATGATCTGGTCAAGTCAGGCAAGCATCTCACCCTGCTGGCTGATCTGGCGATCTCCACGTA  
GGTGTAGTCGGTAGTCAGGAGCAGTTCTGTTCTGGCAGGGCTCGCTGAGTGGCTACAGTCTGCTGAGTACAGTCT  
CCAGGTGCGCAGCAGTAACGTCGATACCCGCTACCCAGTGGAAATTGGCTCCGGGATGATTGCGGACAGCTGCGAG  
GCATTCTCGATGACGCCATAACGGTCCGGTGAATGAAAGTGGCTGAGGAAGTCCGGGGAGGGACCTTTTACCCAG  
CGTCTCGGGACCCAGTCCTGAAAGTTCCGTTGCCCCCTGTAGGAGAGGATGATGTTGCCACGGTGTGCGATCGCG  
GCCGAATGCCAGCTGGTCAGGTAGTGTCTCGGGCCGGCCATCCAGTCGCTGTCAGGGCATTTCTGCGCC  
CTGAAACGGTAGAGCTGCTGATGGGATGCCGACGATAGCATTCTGATGCGCTGCCAATGGGAAATGCGCATGAC  
TGGGTTGATGTCCTGCCCTCGTCCAGGAGCATGCACTGCAAGGCTGGCTCAAATCGGGTTGCTCAGTTGATACAGCT  
TCAGGTAGCCGCTAACGGGCATCACATGCCGGTGTGAGGAGCATGCACTGCGCTCCAGACTCGCAGCCATGTCC  
AGGCCCTGCTGAGGAAGCCTCTGAGCACTGGTGGAGAACGCCCTGTCGGGAAGCGGGAGTGGCTGGCCAG  
TTCCGGCTGGCGCTGGCATGTAAGTGTCTAGCGCTGGCCAGCAGTCACCTCTGCTGCGCTGCAATGGGAAATGCG  
CGCGGGCAGATATGCGTAGTCGCAAGGTTCTCGCTTCTGTCGGCTGAGTGGCTACCCAGTCTGGTATCGAGTC  
TGGGGCTTGTGACACTACGGTCCGGGAAACTTGCCTTCGGGTTCTCCACCGAGCTGTTGAGAGATAGAG  
GATTCTCAGGGTAGGGTTCGACCTGCCAAAGGCCAACAGGGTGTAGTTTCCAGTGTGCTGCAAGGCTCGCACCAGGA  
TCTCCGGTCTTCGACTGGATGATCGGTGACTGTTGTAAGTCCACTGCAAGGGCTCCCTACAGGTTACTTTTGA  
GGTGGATGCTGTGATGTCATACCGCTACGCCGAGCAGGGCTCCGGGCTCCGGGCTCGCGATGGTAGTCATGTTG  
GGATTGCCAGGTAGACCGTCAACGGAGCACCCCTAGCGGAATGATGCTGCCGCGCCCTGTTGGTATCGAGTC  
TCCCGCCGGCGCCAACTTGCAGGTCGGGCAACCGCGTCCACCCAGGCGCTGAAACGCCATCACGAAATA  
CGGGATGCTCATGACCGAGGATCACAGGCGCACGCAATGTCAGCACCGTGTACAGCGGGCCAGGGCTAGTTCTGCA  
GCGTGGAGACACCCTGGCGGTGAGATAGCGAACGTCAGGGCTCCGGGCTCCGGGCTCGCGATGGTAGTCATGTTG  
GTCATCCAGTCGACCATCCCGGTTCTCACGAAACACCAGTCAGGCAACTGGGCAACTCCAGGCTGCCAGGTGGCG  
CTCCGTCAGCAGCAGCTGTTGAGCAGGCTCCGGGCAACCGCGTCCACCCAGGCGCTGAAACGCCATCACGAA  
AGCCCCGTCAGGCCAGAAGAAATCACGGCATAACCAACTCCACGATGTCAGGCTGGCCATCACGAA  
ATTCCAGGAGCAGGAGTAGGGGGCAATCGAAATGCAAGACTGGCTGGGTTTCTGGGTAGCCGGGGAGAAATG  
AACAAAGATGTTCAAACGTTCTATAGGAAACTGTGTTGTAECTCCATAGAAACTCCCTTTACAGATGCA  
GCTTGGAGTGTGTTCCACTAGTCTCGGGAGGCCGTCACTGAGATTTTGGGGGATATCTGGCATAGGGGGAT  
TGAATAGCGCTGTGCTGAGCTGACGCTTCTAGGAATCATCTGATAGAGGGAAATTTCATGCCGTAGCTT  
CGGATGAGTTGAGAATTCTTACAGCTTCTGAGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTG  
TGCTCCGTGGCGCTTGATGTTGCGTGTATGCTGAGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTG  
CTCAGTCGGCAAGCTATGAATGTCGCTATGCTAGCAAGCGCAGCTTATTCAGCGAGCAGGGCTGCTCAATCATT  
GAGCGGCAATGTCGTCGCCCTGGCCGGTAGAGCGCTGCTCAAGCAAGCGCCAAACATGTCAGGATCCTGCC  
GTGACCGAGGGCGAGGTCTGCTATTGACCGCTCGCACGCTCGTGTGATCTCCGGAAAAGCGGCTGGCA  
GTCGATACCGACAAAGGCCCTCTGGTTACCGCTTACGCCGATGGTAGGCCCTCGGCAGCGATATCCAGCACGATA  
CAAAGAGGTGATCCAGGAGCTGCTGGCACTCCGCTGGCGCTGGTACTGGTAGCTGACGGTAGTACCCCTCAACGCC  
TGTACCTTTTGAATCTTCTGGCTGAGTCAGGCGGGAGGGGGCTAGGCTGGAGATTCTGGCGAAGACCTCGATTG  
ATGTTGCGCCGAAATGATGCCGAAACTACATGCTGCTGATGCTGGAGCTGGCTACTCGCTACGGAGCAGGGC  
GCTGGGGAGCGGTGCGTGGAGACGGCTTCCGGTTATCGGTCTGGCCACTGCCAGCAGCATA  
TGGGTCTTTCAGCAGTGGGCTTCTGAGCTGGATCTGATCTACATCGGTATCGTCGCTGCTGCTGCTG  
TGGCTCCCTCTGTTACTTGCCTCTGCGTGTGCACTCGCAGTCGGCATCTACTGCTATTGGCTGGTGC  
GGAGCATGAGCGGGCTGGAGGAGCATGAGCTGGCTGGAGGAGCATGAGCG  
ACGCTTGTAGAGGCCGAAAGCGAGCAGCTGGCTGGAGGAGCATGAGCG  
CGCCGTCGCGCTGCGTGTGCGTGTGCGTGGAGACGGCTTCCGGTCA  
GATAGCGAGGGGATTGCCAACGACGCCAGATGGATTCTCCAGGGCTGGAG  
ACTGGAAACCGAGGGCAGGGCTACATCTCATCTAACACGCCAACCGCT  
CCTTCAGTGAATCAGTCAGCAGCAGGGGACTGGCTGCCAATCC  
GCCAGACGCTGTTCTGCCACCATGAGCCATGAAATCGCA  
TGGGCTACCGAGCTGAGTCGGCACGGCCGGTACCTAAAGG  
ACCGCATGGGATCAACGTCGAGGATCACGCCGCTGTG  
CCAGGCACGGGCTCGGCTTGCTGATCAGGCCAGCCTGGCG  
TGGGGTTGGGAGCAGCTTCTGGCTTCTGGCTGGAGGAG  
TGGCGCCCTCAAGTGTGCTGGCGCTTCTGGAGCT  
CATGGTGGCGAGGCCAGGTCGCTGGAGGAGGCCGAC  
CGATGTTGCAAGCATGCCAGGATGCCGGTGGAGCT  
TTCCCTCAGGGTATGGAGCCAGGCCAGGGCGAC

## FIGURE 2C

TGGCTGCTGGGCTAACAACCTGAACGCCCTGCATCGTCTGGGCCATGGGCGTCTCGTCACTCCCTCGAC  
 GCCGCCGATACTGGCTGGCTCCGCTGCATCGCAGCTGGCGCTGGAGCTGCTTCGATGCTCGAGGCGTTGCTGACTGCCAG  
 TCTTGAGGGACAGATGGAAAGCCTGAGCTGGCTGGAGCTGCTTCGATGCTCGAGGCGTTGCTGACTGCCAG  
 ACGCCCTGCTCGCAGCTGGCTCACCGATATCACATGCCAACATGAACCGATAACGCCAGCTACGGAGCTACGCCAG  
 CCAAGGGTTCCGGCAGCGATCATGCCGAGCGTGAACGCCATGCCGAGGAGGCCAGGCCGCTGATGCCGAGGCC  
 TGAAACGATTGCCCTGCTAAACCGGTGGATCTGAATGCCCTCAGAACTGCTGATTAATATTCTCAAGGTGGATCGATGA  
 GCTGAAATCCTATCGGGTCTGGTGGCTGAAGATCAGCCGTTCAAGCGAATACCTGCTCAACCTGTTGCCAGGCC  
 GGCGTGCAGTACCTGTTAGGTGCCGGCAGCGCGGAGGCCGTTGCGCTGCAGCAGGACAGGTTGACCTGATCCT  
 CAGCGATCTGATGATGCCGGCATGGATGTTATCAAATGATCCTGCAACTGCCGATCTCAAGCATGTCGCCAGCTGG  
 CGCTGATGAGCTCTCGCAGCGGATGATGCTCAGTGCAGGCCGGCTGCCAGAGTCTCGCTTGCTGGTAATCGAC  
 CTGTTGCCAAGCGACTCTGCCATCGGGCAAGGCCACTGGGAACTCTGGAACACTCGGAAAGATGCCCTCAGGCCAGGCC  
 GCCGAAACCGCAGGACTCTGCCATGGGCCAGCGGCTGCTGGATGCCCTGATACAGCGAACCTGGTACCGTACGCC  
 AGGCTAAGAAATCCCTCACACCGGGCCATAGTGGCGCCAGGCGTTGATACGCTGGAGGCCACCCGCAAGCATGCC  
 TTGCTGCCAGCTGTTCATGAGTGTGACGCTACCGCTGCAACGAGGCCGTTGCTGCCGCGTGCAGACAGAC  
 CCTGAACGCCAGGAATCGTGGCGAGGGCGGTTACGAGATCCGGTTCCGTAATCTGCCGCCACCTGCTGATA  
 ACCAGGAACTTGGATCGACTCTATGAGTACGCTGGCGCTGCCGGGCTTGTAACAGCTACTATGTTGAGTTGACC  
 GAGACGAGTGTCAAACTCTGTCAGAACTACTATGAGTACGCTGGCTGCTGCCATGAAAGGGTTGGGATTGGCCA  
 GGAGACATTGGCCAGGGTACAGCTGCTCTATAACCTGGTACAGGCCCTTCACGGAGCTGAAGATGCCGCTCCC  
 TAGTCCAGGGATGCGTAGAGGATAACGCCCTCATGCACTGCTCATCTGGTATGGTACCGCCACCCCTGAAATCTC  
 GACGGTGGCCGAAGGCCGGAGACCTGCAAGGAACCTGAACTGAACTCTCTGCTGCTTGGCTGCCACGGGCCAGGGTT  
 CCTGATTCTAAGGAGTGTGCTGCTGAGTTGAGCGGCCAGTTAAGGGAGGACGCCCAACGCCCTTGTGTTAACCGA  
 -GTATCCCCATTATCGCGGAGTCGATCGCAGCAACCCAGCTAGCGCAACAGTGTGCTGAAAGGAGGCCATCCCGTGA  
 AGTCTGCTAGTGGCTGGAGCACAACAAATTGCTCAATGGACAACCCCTCTCGCAAGGCCCTGAGCATCGGCTTG  
 ATCTGCTGGTGTGCTGACCTGTTGAGCTGCTGAGCTGCTGAGGATGTTGGCTGCCATCGCTGAAAGGGAGGAGG  
 CAAAGTCTCTTCACTTACCCGATATGGATTTATACGGAGCATGGATGTTGGCTGCCATCGCTGAAAGGGAGGAGG  
 GCGACAAGACCAACCCAGAAGTACGACTATGACGGTGCCTTGCAGGCCACTGTTGGCAAGGAAACGGATTAGGG  
 GTCTATGAGGGAGGGAGTTCTTGTATGCCATTCTACTGGTACCAAGCACGCCGTTGAGGCCGATTCTCTGGG  
 AGATCGTGTGGCTCGGTATGGCTGCCAATTCTACGGAAGCTCTGGAGTTCCGCTATCCGCCACAGT  
 TACTGATCTTGTACTTCCGGCAGGCCGCTGGCAGTCCGCTGAGTCCGCTGATTCCCTCACAGCGCAGCGTGAAGGTTGAGC  
 GGAAGCTATCCGATGATAGTGCAGCGCATTCCGGCCTGGCGACCCGGCTGGGGAGACGCTCAGCGTGTCCA  
 TTGGATACCGCTGATCGTATCGCAGTCCGGCTGGAGATTTGGAGTCGCCGGTTGATCTGCCGGAAACACTCT  
 GGTGCCACGACGCCGAAACCATCTGATCATCGCTGCAAGGCCCTGTTGATCTGAGGAACTAACGACTTCAACAGTTG  
 GTTGAACGCCCGCATTCGATTCTGACGCCCTGATGGCGAGGTATTGCTGCCGCGGCCCTGCAACCG  
 CCTGGGGATGCCCTGAAACCTCACCGACAGGGGCTGCCCTCAACTGCTCAGCCAGCTGAGAACGGTTGCCGCG  
 TCTACCGAAGCGACTACGGCAATTCTCCGCACTCCGGCTGGCTGGAGCTGCTGAGCCCGCTGCTC  
 CTGGCGGTTGGCTGGGATGGCTGGTACACAGCAGCGCTGCAACCCGGTCACTGCCGCAACCGGCCACTGGTGG  
 GAGGCCACCTTCAGCGGAGCTGATACAGACCGCGCCGGCTGCTGGTGTGACCCAGGATGACCGAACCTGG  
 TGACCTGCAACACTTGGCGCCAGTGGCTGGCGGGCCACGGAGATCTTGGCTGACTTCAACTGAAAGCTTT  
 GATGCCGTGGGAGGTACAGGAGACATCTGATCCAGGCTGGCGCTATTGCAAGACGCCCTTCCGGCGACCCG  
 CTATGCCGACCGAGGCCGACTGCTGATTCAGACATCACGGTCACTGCGAGGCCGAGACGCCGCTGCTCAATG  
 CGAAGCGAGCAGCGATGCCGCAAGCGCAGGCCAGGCAAGACCTGTTCTGCCGCACTGAGCCATGAAATCCGACT  
 TACGGTCTTGGCACCTGGAGGCTGCGACCTGAGCTGACCCCTGAAACGAGGCCCAACGCCCTACCGCACCATCCA  
 GAGTCTGCTGCCAGCTCATGCAACTGATTAGCAGTGTGCTGGATCTCGCAAGATCGAAGCAGGGGCAAGATGGCTCTGA  
 CCCTGGCGCCTCAATCCGCTGGACCTAGTGGCGAGTCTGGCAACTTCTGCCACGGCCATGGCAAGGACCTG  
 CAGTTCTATGCTGCTGACACCGAAGTGGCGGCAACTGATCGGTGACGGTACGCCGATTGCCAGGGCTGCTCAATAA  
 CTGGTGAATAACCGCTGAAAGTTCACCGATATGGACGGGGTCTGCGCTGAGTGTCTCTCCCGCAATGATGGTC  
 GAGCCCTGTTGCGAGGGCAGCTGCCGACACCCGATTCGCTATCGCAACCGAAGCAGGCCGCTTGTGAGGGCGTTC  
 TACCGGTTGGGAGGCGGACCATCGGGGCCGCTGCTTCTGCCCTGGCCAGGGCCGGGGTGGCGCGTCCATGGATGCC  
 CGGTCACCTCGCAATGGTCAAGCGAGCAGGGCTGGCGAGCAGCGCTCAGCTGGCTGGCGATCTGGCGAAATGATGG  
 CGGGCTGGCTTGGCGCCGGGGCTTGGATGAAATCGCTTGGCTGCTGCCATGCGCTGCCCGTGCAGGAGCTAGCCGACAGC  
 GTAGGGCGTGGCTGAAAGCCTGGGCTGCAAGGTCAAGCGAGGCCGAGGCCCTCCGAGCTGGAGACTTGTGCT  
 TCTGGAGCTGCTGCCATGGCGGGGGCTGCTTCTGCCCTGGCCAGGGCCGGGGTGGCGCGTCCATGGATGCC  
 CTGGCAGCGGAGCTGCTGGAGGAGGCCGAGGCCGAGGCCGAGGCCGAGGCCGAGGCCGAGGCCGAGGCC  
 GCTCTGGGGATATCCCGAGCAAACGCCGCAATGCTGCCGCGCTGCCGGAGACTCGACCTGGAGAAGTGTGCTGG  
 CGCCGAGGAAACCCAGTCAACCGGCCGCTGCTGCCGAGCAACTGGAGAGCTGGTGTGCGCTGAGGCTTGGCGGG  
 ATGGCGGAGGCCCTGCACTGCTGAGCTGCTGACCTCTGCTGCAAGCTGCAACATGCCGAACATGACC  
 GGCTACGAACATGCCACAGCGCTGCCGAGAGGCCGAGGCCGAGGCCGAGGCCGAGGCC  
 AGAGGGCGAGCGCTGCCGGCAGTGGGAATGAAAGCTGCTGGTGAAGGCCGATCACTCTGCAACCTTGATGAACTGC  
 TCACTGAGTTCGCTGCCAGGGTCTGCTGCTTCCCGCGCAAGCGCAGGCCGAGACCTCGCCGCCGCCGAGCTCGACGCC  
 CTCTCACCGCAGGTGCGCAACCGATGCCGCGCTTCTGAGGACATGCCGAGGCCGAGGCCGAGGCCGAGGCC  
 GATTCGCGCAACGCCGAGGGGCTGCAAGCGAGGCCGACCGCTACGCCGATGCCGAGGCCGAGGCCGAGGCC  
 CGCTGGTGTGATGCTGAGGCCGAGGCCGAGGCCGAGGCCGAGGCCGAGGCCGAGGCCGAGGCC  
 GTGCTGTTCATATGAGCAGGCCGCTGGAGTTGTGAGAAAGACGGGCTGATGCCGCTGGGCTCAATGTTGGAAATTAGA  
 ACACAAGAGAAGCCTATGAGTAAGCTCAAGATAGTACTGGCGATGACCATCCGATCTGCTGCTATGGGCTATGCGACAT  
 GCTCGAGGCCGACGGTGGCTGAGGTGGCGAGGCCCTCACGCCAGCGAACTGGTCAAGGCTGGTGTGCCGGCAGAGCG  
 AGGCCGATATGCCATTACCGACTACAGCATGCCGGGAGCAGGCCGAGGCCGAGGCCGAGGCC  
 TTGCCAACTTCTCTGACTAAGCTGCTCATCTCACCGTGGCAACGCCGCTGATCTGCCAGGCCCTACGATCA  
 CGGGGTGTCGGCGTGTGCAAGAGCGGCCGACTCGCAGAGCTGCTTGGCGCTGCCAGCTGGTGAAGCGAGAACCGCG  
 TCTACCGGGCGCGAACATGCTGCCACCCGAGCGTGTGCTGCCGAGCGAACGAGTGGAAAGGCCGCTGCCGCGTTC  
 TCGATGAAGGAGTTCGAAAGTACTCCGTCACTCTGTTCCGGCAGCACGCTGCGATATGCCACGGCTGCTGAAACCTAG  
 CGTCAAGCGTAAGCACGCAAGAGTCTGCCGATGCCGAGCTGAAAGTGAACAGCGACGCCAGGCCCTGATGACCTCT

## FIGURE 2D

FIGURE 2E

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FIGURE 2F

GATCAAATACCAGGGCAGTAAGCCCGGGGGCTTGCATGAGCGTCTGTAGCGGGTCAATTCTGTTGGTCAGTCCC  
 CACTCTGGGCCAGGTCGCTCTGAGATGCTGTGTTCAAGCTGGCTACCGGACAGTTGGCTGGCTGGCTGGCCTC  
 TCGGCTGCCGGCCCTCCGGCGCTGGCGAGTCAGCTCAGCAGCACAGGGCGGACAGGAGCGATACGGTTCTGA  
 TCATGGCGGGGTTCTATGGTGGATGCGAACGCTGGCGAGGGTGGCGACGTCAGGGCGGACAGTGGCTGGTACCATCTGCAAG  
 GTCGTCAGTCGCCAGGTGCGCCGGCACGGCATCTCCCGCGAATGAGGTAGATCTGCTGAGCTGGTGGATCCC  
 GAGGTGCAACCGACAGAAACCGTCTCCCCCGCATACTCCACGCCAAGGATCGAGAAAGGGCGGGGCTCCATCGGTTG  
 GGTTTCGGCTTGGGCTTGGCGGTATGGGCGTTTGGCGCTGGCACGATCAGCGGCGGCCCTGGCTGCTTTCTG  
 AAGCGTGGGACAGAACCGTCCAGTGTCTCCACGGTGTGCTTGCAGCACCAAGGGTGGCGGAGGGGGGGTGTCTGAG  
 CCAGGTTCTCGACGGCATCGGACGGCTTGGCGAACGCTCGCAGGCCAATTGGTGGACAGGCCGCTGCTGGCCT  
 GAACCGAAGTCTCTGCTGACAGGTGCTGCTTCCACCGCGTCAAGGGCGCTGTCAGCTCAAGCGAGGCCAG  
 GATCGCTCCAGGGGCCCTTCCCGCGCAGTGTCCACGCCATGCGAGCTGAAGGAGTGGTACTGCTGGTAGCTCA  
 GCAGGCCGGCATTGGCTCAAACAGAGGCCAAGAATCATTGATGCAGGGGATGGGCGTTCATGAGGGCTCTCGCGCA  
 AGCTGGGACAACCTCTCAGACGGAACAGTGTGAGTCAGTAGGAAATACTCGCGGAAGGGGGGAGGATTGGAGGG  
 AGAAATTCTGCGAATCTCCGGCTAATGCTGTGCGAAGCTGACGAAGCTGGGGCTCTCGTGCAGCATCAGGGC  
 TGAACGCTGGATGACACAGGCTGACCTGACCCGAAAAACAAAGTGTGAGTCAGGCTGCTGGCGGATCGAC  
 GATGGGGCAGACTGGTGGAGTAGTCAGTGGAGTCTCGGTTACCGGAGTCAGAAATAGGATAATCCGCTCC  
 TGACCGAGAGGATCAAGCGCCGGCATGTCAGATGTCAGGGTGGAGGAGTGGTCCGGTGTGAGGAGTGGTGG  
 GGAGGTGGGGACAATAGAACAAAACCAAGCTAACAGGAGAACATGAGTGTGCTGACCCACACGCCAACATGCCACT  
 ATCGATTGACGATAACCGGTATACGTAAAAGCATGGAGAATCAGTATGTTACTCACCCAGACGAAGGTTAGGTTGACCA  
 TTGCGCTGCTTCTGAGTTATGGGCATAGATTATGGCGAAGCTATCAGAAAGGATGCAATGATGACAAAATCTACT  
 TTGATCTCTGAACTCGCTGCCAGGCTCATTCTGCTGATACAAAAGTCTTATCTGCTGAGGCAATCTCCACAATGTC  
 CCAATACTGGAGTTCTCGGAAACCGTATAACCCATGTCAGTACATTAATGCTTGTGATGTTCCGGTGTGATATT  
 TGACCGAGAGGATCAAGCGCCGGCATGTCAGATGTCAGGGTGGAGGAGTGGTCCGGTGTGAGGAGTGGTGG  
 GGAGGTGGGGACAATAGAACAAAACCAAGCTAACAGGAGAACATGAGTGTGCTGACCCACACGCCAACATGCCACT  
 ATCGATTGACGATAACCGGTATACGTAAAAGCATGGAGAATCAGTATGTTACTCACCCAGACGAAGGTTAGGTTGACCA  
 ACCATAAATCAGCAAGCCATCAACATGGTCAAGATATGCAAGGATGGAGAACAGGAGTGGAGAACAGGTTGGAGGCCCTCCAGGC  
 CAATATGCAAGTCTCTGATGGACAGGAGATAAATACTGATTTCATCGCTGTAATGAACTCGCTGCTGGCAGAGGCC  
 AAACCTCGCAATAGTTCAAGGGCATATCACCATCGGGTACGGCTTGTGATACCTTGTGCAAGGCAACAGTAAAC  
 TCTTGAATCTGTTGTTCTACGCGACAGAAGGTATTACCTGCAATTGCAAGCTAACGCTCCGACCCAGGTTCTGGAG  
 CGTCTATGCCCTGCGGGAAACAGTCTACCGGTGAGCTGGCTTACTACTTTGTCAGGATCTTGTGCAAGGCTGTTGTC  
 AACGCAAGCAACCAAGTTGCAAGTGGATGGGCTACCCAGCTATCCGGCTTACGGGCTATCTGGCTGCTGCTATCTAT  
 TATCAATATGGGAGACTGGTAACTTCCAAAATTCAACAAGCTATAATAGCATGATTTCTCCAGTTTCAACAAAGGATGCTCATCCATGA  
 ACTTAGAAACTGGAATGGTGTACCGAATGATCTCTCCAGTTTCAACAAAGGATGTTGAAAGGCCAGGCAAGTATCTGG  
 CAATATCTCTAACATGAGCAATGAGGATATGGATATGAACAAACACAGTGAGCGAACAGCAACAGATCAATATTACCA  
 AAATCTGGGGCAGTCTATCTGGCTCTACAGGGCTAACCCAGTGTCTCTGGCCAGCCATTCTCAGGGTAC  
 AGCTTGGGAGGCTTGGGATATCTCTGGCTACTCCGGTGTGAGCTTGGGCTAACGGGATGTCAGGAAATCTGATAAG  
 GAGTAGCGGAACGATCTCTGCTGACTCAGCTGGTTATCTGCTCTCCAACTCTCAACGGGCTAACAGCAAGGCTAAGGC  
 GTGCGGGGAGGTTACAGCTTGTGATCTGCTCTCCAACTCTCAACGGGCTAACAGGAGTGTGCTAATTATC  
 TAAACCTGCTGAAACAAATCACCAGAACGATAACCGACTAGCGTGGAGGATCATGTCAGGTGGCAGTCCGAACACAG  
 GATTCTGGAATCGAGGCTCTTACCGGTGCGAGTCTGGCCGCTAACTCAACACTCAGCGATGAATCTGCTGC  
 CAGTCTCAACAGCTGCTACTCAGGGAAATCTGGTGTGAGCTTCTCAGGCTGAAATATTGGCTGCTTACACAAACATAG  
 CCACTGGTATTCTGTATACACCCGGATGGCGATAACCTGGGCTATTGGGCCACGGTTAGAGATGGTGAACATTAGG  
 GAGAAAAGGAGATGGTCCCAGATCACTGCTGTTCAATTGCTCATATTGCGCCCAACATGACCCAAAGCTGCGA  
 AAATACCAAGCAAATGAGTACTCATTGGGGATGGAAGGGCTACATCAATATCTGGCCGAAAAGGATGAGGCTCAGGCA  
 TTTCTTATCCATAATGATGGGCTAATGGGGCTACATGCGCCTTAAAGGACTCTTAGAGATAATAAGGAGTGGTGC  
 TTGCGCTATTCTGCTGTTGCTAAGTATCACCCAGACAGGGCTGCTGTCAGTAAGCGTCAAACGTGAGGAAA  
 ATTGCGCAAGCTGCTCTGATGGCGCTTCAAGTGGTTGCTGAGGAGGCTTATAGCGTCCCGCCCAAGGGCTGCTAC  
 TATATGCAAAATAGGAAAACAAACTCGACAATGGTGGGATGATTGGAGAAAAGGCTGATGCGCCTGGCTCGCCCTTATC  
 AAATAAGTTTGTCACTGCGCAACCGAGCTAGCTTACGCCAAAGATTAATCTGACGACACACACTTGCCTGATGATCA  
 GTGCTGAAAAGGGAGAGAATGCTGCTGTTGGAGTATGCCCATGGGTGCAAAAGCAAAATTCTGTAAGAGATGACGCC  
 CAACCCGCTGAAGACTTGTCTCCGGAGCACGCTTCTGCTATGGAACACGCCAACGGCTGATGCTCTGCTGAGGG  
 ATGACGCGACGAGAAATAATGACCGCTGCTAGTAGGCGCTTACGAGGCGATCTTCCGACTCTCCGCGGCC  
 TGACTGACTCTGCTGCGGAAGTGTGGTAGACGCTTGGGACTGATGTTGAATTGCGGGGAGCTGAGCCCTTGGG  
 TCGCCGGCCGTCGCCCGAGCCCCAGGGTACCCCTGCTGCGAACAGGCTTTCGGGCCCCGGTACCGCGAGGCC  
 TTGATATCTCCGGCTACCGCGCTGCTGCTGTTGCTGATGCTGCTCAGCAAGGCCAGGGCCGGCTTTCAGGGTAAGCGT  
 ACGGCCAATACACCTTACTTAGGTTGAGGCCATCAGCAAAGAATGATTCTGATGTTGAGGTTACCCGCTCATGCA  
 ATTGGCTTGGTACCGACATCTACTCGGAGACCTCTGTCGCTGGTAAACACCATGTCGACCACTCTGCTAGGTTT  
 CCAACAGAGCTACGCAATTGATAACGACTCATGCCATTAGCATTTGATGACGGCATCGGTCAGTTGCTAACGCCAC  
 CATCTGCAAGCACACGCCAGTTGAAATCTCGATTGCTTGTGATCCAAGTCTGGGATTGTTAGTCCCACGATCACCTCC  
 GCTTCTGTCAGCTTGGGATAGCTCCAAACTCAACGAAGCTTCTCGGTAAGCAGCTGTTAAGCAGTGTGATCATCTT  
 TCTCGATTCCGGCTCTGCAACAGCTGTTCAAGCGCTAAACATCCGGCAATATCCCTCACCTACCAAGTAT  
 GATTATATATGTTACAGGGGACAATAGATCACAATAGCTAGATCTGACCCACTGATGCGGAGCAACTGGCTGATG  
 TCTTGCACCGTAACGTCGGCAGGGAGTTAGCACGTCCTTCAGGTAGGCATACGGATCATGCCGTTCATGCGAGGCC  
 CTGGATCAGGCTCATGATAGCTGCTGCTGTTGCCACTGCGCAGCGATCCGGCAAATAACAGCTTGCAGCGTCCGAGGCC  
 CCCACGGCCATCTGGTCTCCACCTGATTTGTCGATGGCAGGCCACAGCCCACGTCAGGCTGCGTGGCTGCC  
 CAGCGTTCAAGCTGAGTCAGGGCTTGGCTGAGGGCTTACGGTGTGGCCAGGGCACCAGGTCGCGCTGGGCAACATCCAGTC  
 ATGCACTGGTGTGCTGATCGGTACCGCCATTCTGACGCTTACGCCAAACGGCTTCTGCTGAGCTGGCTGAGCTG  
 GTTCAACCTGTCACAAACCGCCAATTGAGTCAGCGCCTGTCGGCAAGTGGCTTGTGAGCATGCACTGAGCTG  
 AACTTGCGGCCAGCATGAGGCCATGCCGATTCAGTGTGCTTGTGAGGAGTGGCTGAGTGTCTCCGGCACGGCTGG  
 GCAGACCGAGCTTGCACCCAGTGCCTAGGAAGGTTGCGTGTGAGGCCAGACATAGACCCGGTGGGTTTCTCTG  
 CGCCGGTGGCAAGC  
 ATTTGACCGGTGTTCTGATCGGCGTGGATCACGTCCTGTTGAGCACGCGCTTCAGCGAGTGCACCACTGGCTGAAGC

## FIGURE 2G

FIGURE 2H

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
Applicants: Laurence Rahme et al.  
Filing Date: September 12, 2003 Serial No.: Not Yet Assigned  
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FIGURE 21

CGATGTAGTAAGCACGGTTCTATTCTAAGTACCTGCAACGGCAGTCCAGGCTGAGATGGCGAGGCCAGCTTCCG  
 TATTCCATGGTATTCTCTTCGGTAGGAAACACCAAGTCCCATGGGACTGGTAGGCTCCCTAAATGGGAAATGTTTGGG  
 ATTATGCCAGGGCAGATACCTGGCATTGTTGGCCAGGAACAGCCAGGCGAAGTTCAGAAGACTGACTGCTGAGCAGC  
 AGCTCCTCTCGACGTCGAGGCTAACCTCTCAACTTCCGGAGGGCAGGCTTCAGCTACGATTGGATGTTGCTCAT  
 GATGATCTCCAGATAATGGAGAACACACGCCCTGGGGAGATGGTCCCCCGATGGTAGCCGATGAAGAGTGGGG  
 CATACCGTAGGTAGTGAAGGCCCTCGGGATGAGGCCCGGATTCAATCAAGCCGTTCAAGCAGCGGCTTGTCAAGGG  
 TGCTCAGCGGGGGCTGCGGGCTCACCTTGAGGTTGGCTTGTGCTGGCTTTCACTTCTCCTCGCATCGTA  
 GACGTTGGTGCCTTCAGGAGATGAAGAGCAGCCGGCTTGAGGCTTGTGCTGGGCTTGCCTTGTCT  
 CGCCTTCTGGTGGATGAAGGGATCCCGGAGATATCGCCGATACGGAAAGGAATCAGAACCTCTTCTGGGCTCGACT  
 GCTCTTCTGGCAACCGGGACAAGCTTTCAGCCGGGCCAACCTTGTGAGGAGATGGTAGGAGTACGGCTGAGCTGGG  
 TGCCGCCCATGGAGGCTGCGGGCTCACCTGGGGAGGATGGTAGGCTACCTCGGGGATCGGTACCTCGCGATGCGATTGA  
 GGTACCGATAACCGTGGTGTGAGGCTGAAATATTGGCTTGTGGGTTGGTGTGCTCATGATGATTCTCCAG  
 TTTGTAAGCGAAAGCGGAGAACACCTTGCCTGAGGGAAAGTATTCCCGATGGGCTGATTGGGAGGTAATC  
 AGAGGGAGAGGGCTCCATCAACCTGTGGGTTGATTGATCGCCTACCGGAAGCTGGTGCATCTGGGTTGATCTACA  
 CGGAAGTCCGTGAGTCTTCACTGATGACTACTGGGGAGGGTGTCCGAGACACGTCACTGGCTGAGCTGGTAAAG  
 GATGGCAGGGGAAAGAATGATGTAACCCATGAAATGAAAAGGCCACAGGGTTGGGGCTTCATGGTCAATGAT  
 GACGGGAGAATCCGATGTTTGGCACCAGGTTGGACTGAGGCTGAGGGCAACTGAACAGAGGGCTATGCCGAGCAGATA  
 ACCACAGGCTGCTCATGATGATCATGCGAACCTGGTCTGGGACATTCACTCTCTCGGTGAGAGGCAACCTATGA  
 GCCAGATTACCATACCCATGACGAAAGCATATGCCGTAGCAAGCGGTGCTCGCTGAGGAAGATGCCAACCGCTGCC  
 GCAACGGCAGTGTACCGATTTTGGAGATCGCTGCAATGAGACGTTGATTTCATGGTTTCTCGAAAAATG  
 CGGAAACACCCCTGCGGAGGTTCCGGCAGGGTTGGGGTGTAGCAGTGGTATTAGCGGCCAGAGCAGCTACT  
 TGTTCATCCGTATGGTGGCAAGACTGACTCTGGCAGGGTGTGGTATTGCTCCGAGTGGAGTCCCAAGA  
 GACTGCGTACAGGAGGTGTGGCAAAGAGAACATCTCATGATCGTGGACTCTAACCTGGAGGGGACTCTA  
 TTTGCTTGGAGGTGGTGCATCAAATGGTAGGAGGAAACATCTTGAGCTCTCTGACTGGGTTTCAGCTT  
 GCGGTGCGCTTGGCGGCTTGGGTTGCGTGGCGTTGGCTTTCACCTCGCCGTTAGGCTAGATACCGTCAATT  
 CAGGTGACCTTCTCAGCGGACGATGGCTGGGATGTCGCTGATGTTCTAGCTCGCCAGCGGTGCGGCCAGGA  
 AGGCGAGGATGCGCAGACTCTAACGCAACCGGCGTGTGCTGACTACGACCGGAGGGGACTGAGCGCTCTG  
 CGGAATCACGCAACACTGCCAGGGCAAAGTCAAGCTGGTGTGGAGATGGGATGGTGTGAGCTGGGATCTCGCA  
 GGTGAGGGTGGGAGAAAACACTGCCCTGGCGGAGATGGGATTCCCGCTGGGTTGGGAGGGAGCTCTATCGAC  
 CGAGGCCACCGACCGCTACCAAGACTACGGGTCTGGGATCAACACGGTGGCTGTGAGCAGCATTTGG  
 ATCCGAGCTGATGGGGCATGTCGCTGACAACGTCAGCAGATCACGCTTCACTCGAAGCGGGGGGAAAGTGTCA  
 AGGTCAAGCAGGAGGGAGCGGATGCGAGCGGGGAGAGCGAGGGCGGAAGAGCGCGGCTGGTAGAAACCTGTCAA  
 GTTTCCCAGCGTGTGAGGGAGTCAACTGAGGACACTGTGGTTGAATGTCGATCCCTGGGATGATCGTCTC  
 GATCCCATTACCCGCCATTATCGCTGGGAGGATGGGACCTGGGATGAGGAGGAGGAGGAGGAGGAGGAGG  
 CACCGCGGGCACCGGAGGAGGATCCCGATGGGTAGCGTGTAGCTCGCCAGGAGGAGGAGGAGGAGGAGG  
 GAGAGGGAAAAGGAGGGCCGTAACACCGAGTACGACCCCTAAATCGAGGAAACACCGAACCTTGTGAGAACCTATGT  
 CCTTAAACTCGCTGACACGAGTTGACGGCTCATGACAAGAAAAGAACAGGGAGACACAGGGAGAACAG  
 ATCCGACGCCAACCCGGTGTGAGCGTGTACGGTTGGCAGTGGCGAACCTGCACTCACCAGGGCGTACTGAT  
 GACCGTCACTGGCAGGGGAGGAAATCAAAGTGTAGGCAATTGTTCAAGCTGCGCCGG  
 GTTACTGGCTGGAGGTTATTGAGCGCAGGACCGGACGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 CCGAGGCCGGCGTACTAAGTGGCTGGCGCTGACGCCAACCGAGGCGGATTCGGTACAGCATCCACGGCGCCCG  
 CAGCCCCGCCGGCGCGAGGGAGTGAAGCGTAGCTGGTGGCGGGAGTGTAGGCTGTGAGGCTGCGTGG  
 ACCAGGCCGGTAACCAAGAGCGAGTCCGCCCGAACCGGTGAAACCGGGGTTGGCGTGTGCGTACTCCGCAACTG  
 GACCGGAAGACGAGCACTCTGGCAGGGTGTGACCTGCCAGGCTGGCGCTGAGGTCGCGTGGTGTGCTTGTAC  
 ACTCGCCAGGTTCCGGTGTAGGAGCGCAGGACCGGACGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 ACCTGCTAGTTACCGCAGGTTACGGTGTGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 GATCTAGTATTAGCCGAAACGAGTAGTTGGTGGCAATGTCGTTGAGGAGGAGGAGGAGGAGGAGGAGG  
 TGATCGCTAGCGGAGCTAGTCGTAGTTACCATGGCGTATCTGACCATGCAACGTAACACAGTCCTGATCACGCC  
 GCCGGTGTGTCAGGGCGATGGAGGGCGGGTCTGCCCCATTCCGTTGGCAGGACAGCCAGAGTCCGGTGTG  
 GATGCTCTGGCAGGGCTGGCAGGAGCAGTGGCTCCCTCGGGCCACGCCCTTGGAGCTGTAGGTA  
 ACTCGCCGGCGCTTCTCGGGCTTCTCGGGCTGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 TCCGGCCCTCGGGCTGGAGTTGGCCCTTCTCATCTCGCCGGGTGAGACGTTGCTGTGATCCAGGACCGCACC  
 GTGCTGCGTCTGATGACCGCCGG  
 GGTGACGTCGCGCCGGCACGTCAGCAGTGGCGTCTTACCGTACAGTGGCTGTGCGTACGGTGGCGTGT  
 CGCTGGTGTGATGTTGGCTGGCGTGTGCCCCGGTGGCGGATATTGTTGCTCCCATGTCAGCGTGGTATT  
 ATCCGGTTGAGTTCAAGGATGACCCGGGAGCGGCACTGGCTGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 CGCCGCGAGG  
 ATGGTGGTTGGAGGATGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 TGTCACCCGGGGTGTGACGTCAGGTTGCTGGCTGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 GATGTTGGTGTGCGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 CGCCGGCGCTGGCCAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 CGCCGGCGTGTGCTGCTGCTAACGGCTCAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 GAGG  
 GACTGGGAGG  
 AGTGAACAGCAGTGGCTGGCGGTAGGGCGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 CTTCGGCAACACAGTCGCTAGGGTTCTCGCCAGTGGCTGGCGAGGCTGAGGAGGAGGAGGAGGAGGAGG  
 TTGCGCTGAATGGTGGAGTCACTGGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 CTCGCGCAACTCCCTGCAAGGG  
 GACCAAGGGCCCTGCACTGCGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG  
 GGGCGCTGACCGGGCCAGCACGAAGACGCTGCACTGAAAGCGTCTCGAGGAGGGTGAACGCGAAGCGAAG  
 CGCGAAGCGCG

## FIGURE 2J

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ACGACGATGGCGAACTCAGGGTCTGCAGCTCTCCAGCGTTGCTCGAGATCTGGAGCAGTTCTGGACGTGCGACTC  
 CCACCTCGGAGGCACCTTCGACTCGGCGCGCCGGCGCCAGGCCTTCACGTGCGGAAGCCTTACCGAGGTAGA  
 GGTGAGCAGACTGAGCCTGGATCGGGTTACACTCAAGAACATAGGTCTGGAGGATCTGTTGATTTGGTCTGCTGAAGGTGTT  
 AGGCCTGGGTCGCGCTGCGGTTGACTTCTCCGGTATCGAGGATCGCTGTTGATTTGGTCTGCTGAAGGTGTT  
 TTCGGATCTTGGTGGCCAGCGTATACAGGCTCTGGGCAACTTGCTGGTGGTATCGAGAAGGCCATGCCGGTGG  
 CGAGACAGTGAACGATCCGCGTAGCGTTAGACGACGCCGGAGGAGACACTCATGTTCTCGGACGCCGTTGATTG  
 CGATCAGGCTGGGATCAGGTTGCTACCGCTGGAGGCCAGGCTTCAGGCGCTGCGCTGGCCAGGCCATGCCGGTGG  
 ACGCTGATGTTGGCTTCTCTGTTGGCTGAGGACTGAACATTCCAGCCGCTGCGCCAGGCCAGGCCACCC  
 GATGCCGATGATGATCAGCACGATGATCATCTGATGGAAACGAAACGCCCTGCGTCGACGCCAGGCCAGGCCACCC  
 TGCTCATGGAGCGCTCTGGTGGAGGTTTCACTGAGGTTCTAGGATTTGAGGCTGCTGCTGGTAGGCCGAGCAGG  
 ACCAGGATCATCAGCGCGCGATGAAGATCAGGGCAAGTTCTTACCAAGGCCGCCAGCTGATCTGTTGAGGCT  
 GGTCTCTGCCAGCGCGGCTGAACCTTGACCAAGCGCCCTGGAGAAGGCCCTGGGTTGGCGAGGATGACAGGTTAGG  
 TGGCTGCCGGTGGGAAATCTGACCGGCGCTGCGAGGCCAACACCCAAAGTCTGGCCAGGCCAGGCCACCCGTTAGG  
 GCAGCTTCAAGCGCTTCACTGAGGCCAGGGGGAGATCTTGATCATGCTGGCCAGGCTGCTGAGGGCTATGCCGG  
 GTTGCAGCATGCCCATGTCAGGAGGTTGGCTGGGAGGATGCCGAGCTGGTAGATGGACGCCATGCCCATGCC  
 CCAGCAGACCCGCCCTTCAGCGGTAGGCTGGCAAGCTGACGATGCCACACCGTGGAGGCTGAGGCCAGGCCAG  
 ACGTAGATACCAAGGCTCTGACGAAAGCTGGCAATGGCTTGAGCGTGGCCGGGGCTGGTCAAGGTTGACTGGGTCGG  
 GAGCTGGCCAGGCTGGGACCATGCGATAGGCCACGATGACAGCAGGAACACCCATGCCGAGACGCCAGGCCAGGG  
 AGAGCAGCGCTGCCAGATGGTGGCGCGATCTGGCTGGGCTGCCAGGCCAGGGAGACGCCATGCCCATGCC  
 AGGTTGCCGCTCATCTGCCGCTCTGATCAACGCTGCTCTGGCGGGAGATAGAGGCCATGCCGTTGGCCAGAC  
 CTTGCGCTTGGACAGCCCATGCGCTTCGACGACTGGCGATGGCCACCGGATGAAACGAGTGTGCCCTCATGAGCGA  
 AGATCTTGTGCACTCTGCCAGCATGCGATCTTCAACGGGACCCCTGTTTCAGGAGCAGGGTGGACATGCTTCTGAGA  
 AGCGCTTCTGCCGCAACTGCTTGTGCTAGAAGGCCACTGCAACTGCTCCAGAAGGCCCATGCCGCTCC  
 TCGCAGTAGAAGCTGCTGAGCAGATGCTCATGAGCTGGCCCAATGAAATCTGCCGACATCTGGGGTCTGAA  
 CATGCCCTCGTTGATGCCGCGATGGCGTGGCGTCTGGTATGCCGATGGTCTGACCCAGTGGCTTGGGAG  
 CGGCTGGGCCCTTGGCAACACGCCATGAGGCCAGGGGGCTGCGACGCTGGGAGAACACCCTGGCAGATGCC  
 ACCCGGAGGACGCCAGGCCAGGCTGCGACGGGCCCTGACGGTGAACCTGGGAAACATGGCTCAAGCGTGGGACCC  
 GACCAAGTGGCGCGAGGTTGGCTTGGGCTTGGGAGGCTGGGAGGGGGAGGGCTGGGAGGCCAGGGCTCT  
 CGTTGATCAGGGCGTCAAGGGCGCGATGCAAGACAGGCCAGGGGGCTGCGACGGGAGGGGGCTGGGACAATG  
 CCGATCGCGCTGGGCTGCGACGGGATGCCGACGGGCTGCGACGGGCTGCGACGGGAGGGGGCTGGGACAATG  
 GAGGTCGCGTACTTCGCCGATCATGCTAGTCCGGATGCCGACGGGCTGCGACGGGCTGCGACGGGCTGG  
 GTTCTGCGCTGGGCTGGCGTGTAGACCACTGGGGTCTGGTGTGCTGCCGCGGAAATGGGTATTCCGGCG  
 TCCCTGCGATGGTCAAGGATGTTGGATCCGCCATGGAGCTTGTGAGGGCTTCCAGGGTGAACCTCAAGGT  
 TCTTCCGCGGCTGGGGGGAGGGGGAGGGGGAGGGGGAGGGGGAGGGGGAGGGGGAGGGGGAGGGGGAGGGGG  
 GCAGGTAGGCCAGCTGCTTCCAGGCTGCGAGGGGGTGTGCTGAGGAGCAGCTGCGAGGATCATGCC  
 CGCGGGGGTGGCGATCCGGGCACTGAAACAGGTTGAGCTTCTGACGAGGCTGGCTGCCGAGGCCAGGCC  
 TTGCGGCTTGAACAGTGGCTGCCGACGTGCGACATGGATTGGTAGATGGTGTGACAGAGTCTGTGAGCT  
 GGAACTGCTGACGGTCTCAGCAGGCCGTCGACGCCAACGGATCTGCTGCCGGTGGGGACTCACGACGAAA  
 TGCACCGTACTGGCGCCAGCTGAGTGGCTTACGCACTGAGCTGAGGCTACGCACTGCGATGCC  
 ATCGCTATGCCACGCCGCTCCATGCCGAGGGGGTAAACGCTGGTAATGGTCTGCAAGGCTGGGAGGG  
 ATCGGAAGGCCACGCCGATGCCGAGACGGTGTGATGAAACGAGCAAGCTGGTATGGTCTGCTGCC  
 GTGCCGCTGGCAGGCCATGATTCTGCCAGGTCTGATACCTCCATTGCCACCGTGGGGTGGACTG  
 GGTACCATGGAGGGCTGCGCAAGCGCGCAACTGAGGTTGCTCATGGGGTGCCTACTGAATGAA  
 CGCCCGGGCAGGCCGGCGGAACCGAGGCCCTGGCGTAGAGGGGGCTGGGAGGGGGCAAGCGCTGGAGAAGGCC  
 CGGGCACCGGGTTGGCGCTTGTGGTGGAGCACGACCTGGTCCAGCGAGGATTGACTCGACGCC  
 TCCGCCCGCTGGGGCGTCAACCTGACCCCGGGAAACAGAACGACTGGCAGGCTCATCTGCCGCC  
 GGTCCGCAACACTGGGGAACCGGCTGCGTATGCTGCCGCCGCCGCCAGGGATGGCGAACGCT  
 CGCTGAGGACCTGGGGTTTGCCTTGCCTTCAATTGCCCTGCCGCGGCCAGGCCACCTGGC  
 ATGGCTGGGCTGATCTGCCAAGTTCGCCAACGGTGGCGCAGGCCAGGCCAGGGGG  
 CACGGCCATGCCGATGCCGCTCAGTTCGATGAGATTCTCTGTCAGTCCAGTCACTGG  
 TCGAGGGTGGTGTGCGGACACGGGCAAGGGCAGGCCAGGGGGAGGGGGCTGGGCTGAA  
 GGTGAGATTCTCCAGGAAGGCAACACCACTTGTGTTGAGCTGCACTGCCGCC  
 GGCTGATGCCAGCTGGGCTGCCAGGCCAGGGGGAGGGGGAGGGGGAGGGGGAGGGGG  
 AGCGCTCATCACTGCCGATGCCGACGGGCTCAGTTCGATGAGGCTGGCTGCC  
 GCGGCTGGCGAACAGGGTGTGGCTGGCGCTGCTGAGGCTGGCTGCTGCTG  
 GGAGGCTGGCTGGGAGGGGGAGGGGGAGGGGGAGGGGGAGGGGGAGGGGG  
 GACCGGGAAATCGAACCCCTGGGAACGACGACTGTCGTTGAGCTG  
 CCCGGGCTGCCGAGGGGGTGTGAGGAGGATGCCGAGGCCAGGCCAGGG  
 TCCCTGCGACTTCCAGCAGGCCAGGGAGGCTGCCGCTGAGGCTGGCTGCC  
 GACTGCGCTTGTGCACTTCGAAACGAAGCCGGCTGGATCACCGTGG  
 CTTCTGCCAGCTGGCGCTTCTTCTGATGACTGCCGCTGGCTGG  
 TTGTTGCCGTTGGTAGCTCAGGATGCCGAGACGCTGGTCCACGG  
 GCGCTGGTCAAGGCTGAGGAGGAGGAGGAGGAGGAGGAGGAGGAG  
 CGGGGGGGTGTGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAG  
 CGGG  
 ACCTTCTGGCTGAACAGGTTGATGCTCTGGAGGACTGGGG  
 CGGG  
 CGCTGGTCAAGGCTGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAG

## FIGURE 2K

**Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND PROTEINS AND USES THEREOF**

Applicants: Laurence Rahme et al

Filing Date: September 12, 2003 Serial No.: Not Yet Assigned

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## FIGURE 2L

GTCTCTGCGTCGAGCTCGTCAACAGGTCCATGCCACCGCAACTTCAACCGTTCCAGGTAACGCCAGCGCCGAG  
 GTCCCGCGAAGACCGGTCGTCCTCGAGCGCAGCACGTCGATTGCTGGCTTCCTCGGTGGAGAGGGCACCTCAGC  
 AACTCTGGCGTCGCTTGCGCTTGAGGCTGGGAGCACACATTTGCGCTCGCAGCAGCATCCAGTACCCAGCTCCGCCAG  
 ACTCTGGCGAACTCCGGGTTGCCGCGAAACGGTCGCGAAGACACTTTCTCGCAGGGCAGTTGGGAGATGGGTGGCTGAGA  
 GCGCGCAGCGGTGTCAGCTCTGCTCGCGTGGAGCTGGGAGAGGATGGGAGATGGGAGATGGGAGATGGGTGGCTGAGA  
 GCGCGAAGCGTTGGCGAGCAAGGGCTCAACTGCTCGTAGTTGACGAGGATCACTGCGCTCTGGGGTGGCTGAGA  
 TGGCACCGTGGCCAGGGATAGACCTCTGGATCTCCCGTGCCTATTGATCAGCAGGGTAGCCAGGGATGACCAAGG  
 ATTGGTCTGCCCGCCGCCGGATCGAAGCGGGATGACCGCTGGCGGTCTGCCCATTCCATGTCGTCGGCAATAA  
 GCGCGTGGTCTCTGCAAGCAGATGAGCGATGCGCTCAGGCTGGTGGGGCAGTAGAGAGTAGGCCCTGAAGCGCCGCTCGA  
 TATCAGCCGAGCTGTACTCGGTGCGCTGATCTCCGACCGCCGGAGGATAGTGTACAGGCTGACTCTGTCCTCCAGG  
 GATGGCGCTGCCGGTCTCTGCTGACCGCCGATGCTCATGCTGGGAGCTGGGAGCTGGCGAGCGAAGCTGCCGCTCGCT  
 GAGCAGCTCTGGACAGTATCAGAATCTGAAATTGTTCTCGCGAGGCAAGCTCCAGAATCAGGTTGCTTCGGAGCA  
 GCTCGGGAGTGGTGTGATGCGCCAGGAACCTGATGGGCGAGGAATACCCCGCAGGCCATCGCGAGGCCACGCCAACACA  
 CAGGATGAACTCGCTGACAGTAGGACGCCCTCGGCCAGGGCGATGCGCAGCAGCATCCCCAGGTGAAGGC  
 CTGCGGTCAAGCGAGGCTGCGCGATTGACCAAGGAGCTGAACCTCCGCCAGGACTGGAGTGAAAGGCTCCAGCTA  
 GCTCGGGAGACGGTGTACAGAGTGTCTCGAGCTTACGGAGCTGGAGCTGGCTTGGGACCCCGAGTAGCGGTGCAACCGGA  
 TGCTCCCGGGCGCTGATGAAGAAGCGGAGCTCCAGCGAGCGCGCAGATTGCTGCGATGCTGGAGTGTAGGGATCTTCAAGCC  
 GAAGTCGTAGCCGTCGAAGATAGCCGCTGAGAAGCGTGAAGGTGTCGCGAGGATGCTGGAGGATCAGTAAACCGGGTGGACGGT  
 TCATCGGTCTTCAACTGAGTGTGACGCCACTTCGCCCTGGCTTCGCCAGGGCCCTTCAGCGACCATGGGAAGC  
 CGCTCATGTTGGAGGGTCTGCGGGCAGTTGCTGAGGTTGCTGCTGATGGCTCCAGAGCGAATTGTTCCATGAACCAGCG  
 TATGCTCTGCCGGAGGGCTACAGGCTGGAGCTGGAGCTGGAGGCTTGGGAGGCTGGCTGAGGTTGCTGGAAAGGTGCTTGGG  
 ACTCCAGGGCTACTATAGGCTGCCATGCTCACGCCCTGAGCTGCCATTCCGAGGCGAGGCCAGCGAACCTCAC  
 GTAGAGGACAGTCGCTCGAGCTCTCGGAGCTGGCTGAGGAGCTGGCTAGTATGCAATGTCAGGCTGAGGCGATATGTTG  
 GCATATAGCTGGCAGGACAGCGAGCTGACGATCTGCTGGCTTGGCTTGGCTGAGGCGACAGACAGCATTCC  
 CTCCCAGGGGGTGTACTGTCGGTGTGACGAGATGGGAGCTGCTCTGCACTGCCAGCGAGCTCCCTGAGGCT  
 GGTGGTAGCTGCCACAGGTTGCCAGCTTGTGCTGAGTACAATGACCCAGATACTGCTTCAGGGCGTGCAGGCT  
 CGAACAACTGTGAGTCCCCCTGTCGAGGGCGTATAGAACTCTTGTATGTCGTCAGCCGTGAGTTGCAAGCCA  
 TGCGGATCTGCCAACCTCGACGGCGCCGGTGAAGGAGCGTTGAGTCCGGCTTGGCTGGAATTGCAAGTGGCAAGGGA  
 TCGCATTGTAAGGCGCATAGAATGTCGTCATTGAGCGAGTGTACGCCCGGCTTGGCTTACAGCGATGCCAGTAGGG  
 AGAGCATGCCATCCCAATGTCGCCCTTGGCTTGGCTGATGGAAGAGAGCTTCCCGCAGGGCAGGACTGACGTGACT  
 AAGAAATGAATCAGGGCCCGCGCGCTGAAATAGCCAGGCAAAAAGTGTATGACCGAAATTCTCTGCGGACACT  
 GCCCAAGAATACGGCCCATATCGAGGTACAAGTCGATGGCATGGCGCGGCTGCGCTGTTACTGTCAGCTGGGAA  
 AAGGGCAAGGAAGGATTAATGGCGATGCTCTGCCGTTGCTGTTGCTGAGGCGAGACTCCCTCTCGCAACT  
 CACCACTAGCGCGCTCAAGACGCCGCTGACCTCAGCATTTGCGACCGCACCTGGCTGAGTACGGGCCCTGACGCATGATGGTAA  
 AGAGCTGGGGCAGAGGCAACCGAACGGGATGGCAACAGCAGGACTTGGCTCAGGAGCTGCTGAAGGTTGCGCAAG  
 ACCGCTCCGATCTGCTCAAGTAGAAACTGCTGCTTGGCGTGTAGCGCTTGTGCTGCGATACAGGAGCG  
 ATGTTGAAGTCCGAGATGTCCTGGCATCTGTCGCTGAGGTTGCTGCGCTGTTGTATGAGCTGAGTACAGCAA  
 CTGCGTCGCAACTTGAAGGCGCTGAGCAGCTCAAGGCCCTGCTCGAGACGGCGTGTGCGGGGATACGATGG  
 GCAGGGCTGCACTCCACGCAACCAATTAGTGTGACCGTGAATACCTGGAGTAGCGGCCCTGACGCATGATGGTAA  
 CACACCGTGTGTCAGCAGCAGCTGGTGTAGTGCACCGCACCTGGCTGAGATGCTCTGCGAGCTGGCTGCGCTGAG  
 TTCGAGCTGTCCTCGAGGGAGAAAATGTTGCTGGGAGGTTGCTGCGCTGAGGAGCTGGCTGCGCTGAG  
 GATGGATCTGTCAGGGCCCGCTAGGGGGGGCTTGTGAGGGTGCACGGCATGCTCTGTGTAAGCAAGCAGCA  
 TTGGCCGGTGGTTACGCTGAATCCATGTAAGTGTCTAAGCGTGTGGATTCAAGGTTCTACAAGCTAGTG  
 ACTGAAGGTTCTTATTGGATGGATGAGTCAAGTAAATTCTTGTAGTGCAGCTCAAAGTCTCTTGTAGTGCAGCAA  
 GATAGCTTCTACTAAAGAATAGATGTTGCTCTCGCTGGGTTGCTCCAGTTGGCACCACCATGCTGCCCTCGTGA  
 ATAGATTGTCGACGGTCTTAAGTAACGGGAGCTAGCTGAGTCAAGTGTGCTTTGCTCTCATCTAA  
 TTTAACCGGAGCGC  
 CAACCCAGCTCTAACGGGAGGAGATTTGTCGTCGACTCTGCTGAGTGTGCTGGCTGAGTGGGAAGAGA  
 GTATTGTCAGAAATGCTTTGTCAGGAAATTCTCCCAATCCGGCTCTGCCCTAGCTCCAGGTTGTAATT  
 TTAAGTAGC  
 CATTCTTTGAGGCTGAACTCAAAATCGCAGAAACCAATAGAAAAAAATCAA  
 AAGCTCGCTGTGATTGGCAGATA  
 TTCTCTTCTGCAATAACCCCTCTGATAGCTAGCGCAATTGGGCTGTA  
 CATTGCTGCACTGCTGACTA  
 ATAGTGGCTATAGCCCGCGGGTGTGCAAGTCAAGCCGGCGCTCTGGTGGGGTAGCTAACCTGCA  
 CCCCCCTGTT  
 CGATAGCGCGCTGCAACCCCAAGAAGTCGAAGGCCCTTGGCGCTTGGGGTAGCAACCGGGAGACCGCACTTGCC  
 GCAAAAGGAAGTCGCTGGTGCAGCGCCGAGGAGATACTGGCGGGAGCTGGCTGCTCTGCGCTGGGGAGCG  
 CGCGGAGTGTCTCGAGCTCTGCTGAGTAGCTGGTAGAAACTGCTGGACCGACCTGCTGAGTGTGCTCTGCGTGG  
 ATCCGGTCCAAGGCAGCTCGAGGGTGGGGTAGCTGAGGCTGAGGAAGCTGAGTTGCTCCAGGAGCGCGATGG  
 GGCCTCTCCAGTCGCCGGGATCAGGCTTCCGCCCTCATGCAACCTGGCCCTTGTGCGATGATGTTCTACGATCG  
 AGGCAGTGGAGGATGGCGACCAATCCCGCGCCTTCATCTGCCACCGAGCTGGCGTGGCTGAATCGCTTGGGAGGG  
 GTGGTTCTCTCCAGGACCTCGCCGCTGAGACCTTGTGAGTACCTGGCTGCTCCAGCGCCGGGATGGGATGGGTT  
 TGAAGGGCTTCTGTTCTCTGCTCTCGCGCTCATCAGCGCTGAGCTTCTCCAGGCCAGCTTCAACAGCTTCC  
 CTTTGGCGCGAACCGCAGCGCTTGTGCGGGCGACGCCAGGGAGGGTAGTTCTCACTGCGTACACGGCAGCT  
 TCGATCTGACTGGCAAGCGCGGAGCTGAATGAGCTGGTACAGCGCTGCTCATCAGGTTCAACGGCGAGCG  
 CATCCAGTCGGTAGGGGTGATGGGGGGTGGCCCTTCTGGCGCTTGGCTGCTTGAACATCCCTGTCACAC  
 ACTTCAGCCCCAAGGTTGGCGACAGCACGGATATCCGCATCGAGTCCTGAGATATTGGGTTGTCGCTCCGGTGG  
 TAGGTGATGAGCCCCCTGTTCTGCTCATACAGCGCTGGGGACCTTCATGCTCTGCTGGGTGACCAACTCAGCGCATTCCGG  
 GGCCATCTGGAGCGAGGAGGAGATGAACGGTGGGGCGCATCGGTTCTCGCTATCAATGCAAGGCTCGAG  
 CATTAGCTATAGCCCCCACAGTTGCGAGGTTGAGTCTGCGACATCGGCACTCGGAAACACCGGCAGCT  
 GGATCCCCATTCCGGCTCAGGTAAGGGCTCGCTGGCGAACAGAAGGTCAGTTCCACCCGAAGTGCTTGA  
 TTTGCTG  
 GAAGGCAGGATCTCCCGCTCTCGCAGGACCACCGAGTACACCGCGACGGACTGCA  
 CCATCACCGCGCGCAACTCTGGCGTGA  
 CAGAGATACCCACCAGGGGATCGATGACCGCAGGCCATTCTGGAGGGCGAC  
 TCGGGAGGTCCAGGGCGACGCCGGAGCTGAGTTGGCGGTGATGCA  
 TGCATGACTTGTGATT  
 TTGCAAGGCAACCGCGCTT

FIGURE 2M



FIGURE 20

CAGCGAGCGGGAGATTCGGAGATCTCGGTGGCTCGATTCTCAGGCTGGCAACTCATCAGTTGCAGGTAGTCGACCA  
ATATCAGCGGGGGTGTCCGTACTTCTGGCCCGGGCGAACCTTGGCGCAGCTCTGTCGGCGTAGGGTTGCCCTGA  
TCGTTGATGACCAGCCGGCTGCCATAGCTGTTATGCGCTGGATCGCGCAGACAGCTGGGCCAATCCTCTTGCAG  
TTGGCCCTCATCAGCTGCCAGGTCCAGGGCGAACAGGGCGGAAGGCTGAACAGCAACTGCTCTGCCGGCATCT  
CCATGCTGTACACCTGAACAGACTCTGTTGGTCGCTCTGGAGCGCGTGTGACCAGGGTGAAGGGCAACGACGTTTG  
CCCATCGGGGGCGGGCACCGACGATGATGAGATCCGACTCTGAGTCGGCGTAGTCCGGCGTAGTCCGGCGAGATCCTTCAGGCC  
AGTCGGGACCCCGGTTACCGTCACGTTGTTGAAGCGTAATCGATGGTGTGACGATCTCGTGAAGACTCTTGTGA  
TATCGACCAAATCGCGTTGTGGCTCGGCCAACAGGGCGAACAGCTCTGCTCAATCTCTCTGAAACCTCAGAGGG  
ATTGGCCCTGGTGTGAGGGCTCTGGTGCAGTGGTGCAGAGACATCAGTCCGGCAGGGTGTGCCGATGCCGAA  
CGATCTGCCGTAAAGCTCTGATATTGCCACGGAGGGCTGTGCGCGAGGCTGGAGGGTGAAGGCCAGCCCGCCAGCT  
TCTGGAAGGTCTTCGATCGCTCCGACACAGTCAGACATCAAACCGAGCATCCCTCGCGCCAACTCGCTGATGGCGGT  
GAAGATCAGCGATGCTCATGCCGAAGAAGTCTCTCTGCAACTGATCGCCGACAATGCTCCATGCCGTTGTCCA  
GCATCAGGCCCGAGTACCCCTTGCTCCGCTCGACGGAGTGCAGGCCGTAAGTCCAGAAACACTCAGCTCGAGTCC  
CCCGGCTGATCTGCAAGAACAGCTGCTCTCTGCGCCGCCGGAGCGGATGATCTCAGCGCTTCACTTCCACCTTGGCG  
GACTCGATCACCGAACGACATGAGGACACCGCTTCCGCGCTGATCTGAGGGCTGTGCTCTGCAAGAACCC  
TTCGATGGTGCAGAGGTGATTCCGAGATCTCACTTCTGCTCATGCTCAGGCTGGATAGCGATGGTGTGAGG  
TTGCTGATGACGGGATTGCGCTCTCAGCTAGGTGGATAGCGATGGTGTGAGGCTCTGAGGCTAGGCCGATGCCGTTGG  
GATGAGCTCCAGGGTGTGAGACGAGCTGCTGCTGTTGCTTGAAGCAGACGCAATGGCCGGTTGGATGGGGC  
CGAAGTGTCTTCCAGAGCAGGATGTTGGATGCCCTTCCAGTCCGGGGGATAGCGGTATCCGAGATCTTCTG  
AGGTAGCCATCAGCGCTGACCCGGCTGCTGCCGACTGGAGCAGTGTGGGGCTTTGCCCTTCTGAACTGCGTTT  
TGGTGCCTGCTCCGCGGGCAGCCCTTCATGCCGAGTCCCATGGGGTGTGCTTCCCTTCTGAAACCGAGTTGCGCTGC  
CCCAGTCTGGCGGATCTTCTGAGAACTCAGGGCTTTTCTGAGGCGACCTCTGCGCATACGCTCTGGAGCAGATCTG  
AGCCTTTCTCAACCTGGCTGCCAGACCTCTGGCATATCCGGATACAGGCCGAGCAGCACCAGTCTCTGTTGCC  
GGTCCAGGTTCTGGGATGAGCGCTCTCTGCGTTGTAATTCCGGCGGGAGCAGGCCCTCTAGGGCATGG  
TCGAGAGAGCAGAGCGAGTATTGGAAACCTCCCTGCTCGAGCGCCCTGAAACTCGCCGCTGACACCCGGTGCAGGC  
CAGTGTGTTGCGCTGCTCCCGAGCTGCTTGAGCGAGGCTGGTCAAGGAAGGGCTTCGTAAGCGCCGCCGGCTCC  
AGGTACTCTAACGCGGGATGGTGTAGTCTGAGGCTAGGCTTGATGCTGCTGTTGACTGTCGACTCTGGCCCTGCCAGAAA  
TTCACCGTACCGCAACGCACTGCGAGAACGCCGCTTCTGAGGCGAAGAGCTGCTGAGCGACGCTGGTGCACAGCTTGC  
AGCGCTTCTGTTGGGAGCATGAGCGCTGCGCCCTGCAAGGCTGGTGGAGGCTAGAGTACGGCTGAGGGCCAGC  
TCAGGGCGATCCCTGGCCCATGAACTTGAACGCTTCAAGCCGCTGCGATCGCTATGCCCTGGAGGCTACTGCA  
GGAACCTGGCGAGATCCCGCCAGTTCATGAGGCCATGGGGCAGGAGAGCGCTGGTCACTGGGAACCCACGCGGTT  
CCACCGTCTGGGGAGATCTCCCATGCTGAGGCTGAACTGCGCTTCAAGGATCGCGGCTGGCGAATGCCGTTTCC  
GCCTCGTCTGGCGTGGGCCCCCTTGGCATTCGGCAGGGCATCAGCTTCTGAGCTTGGCAGGACTTTTGCTTGTCC  
TACGGCCCCCTTGGCATGGTGTGAGGGCTGCTGGTGGGGCTGGCCAGGGTCACTGGCCGACTCTGGCCAGCAGTGG  
GCCGGCGCTACAGGTTCTGCCGCCGACTTGGCTTCCACACTCTGGTCCAGGGCAGAAGACTGCAAGGCCAT  
TCCGAATGCCGCCCCCAGTCGGTGGCGATGCCGCGCATGGAGCGCTGAGCAGCTGGGATCAGGCC  
GCGCTAGCGTCTGGTGTGTTGATGAAACCTTCAGGGTGTGAGCTGGGCTTGGGATCGAGCTGGGCTTGGG  
CTGGGAGAACAGGGGAGGGTCAAGGTTGGTAATTGGTCTGTTGGGCTGTCTTACCCGATGACAATAGCCAGGGCTG  
CTACGTGCCCTGGGAGCATGGGCTGCTGGGAGGCTGGGAGGCTGGGAGGCTGGGAGGCTGGGAGGCTGGG  
GGCTGGGCTTCAAGGTTCTGCCGCCGACTTGGCTTCCACACTCTGGTCCAGGGCAGAAGACTGCAAGGCCAT  
TCCGAATGCCGCCCCCAGTCGGTGGCGATGCCGCGCATGGAGCGCTGAGCAGCTGGGATCAGGCC  
GCGCTAGCGTCTGGTGTGTTGATGAAACCTTCAGGGTGTGAGCTGGGCTTGGGATCGAGCTGGGCTTGGG  
TAGCTGGGAGGAGGGCGAGCAGCAGGTCGGGAGGCTGGGAGGCTGGGAGGCTGGGAGGCTGGGAGGCTGG  
TCGAGGACTGTCCACAGGCACGCTGCTAGCGCGAACGGAGCGAACGGCCCTGCAACATCGCAGCACCTCAGCTC  
GATTGCGAGATTCTCGGAAGCACCGCCGGCAGGCCGCTGTTGGCATGTCAGCTTGCACCTAGGGCTGAACTGGGCT  
CGGCATCGAAGCTCACTGGAGGTTGGCGTCTGGAGGTTCATATGAGGCCCTCCGGAGCGATTGCAAGAGCGTCTG  
TCCAGAGCCGAAGGGTTCTCTGCCCTGCTGGTCAAGCGATCTGCGGTGAGCTGAGGCCCTCTGCTTGTGATGACG  
CGCAGGCCGCTCTGCCATCTGCGATCGCTGAGCGATCTGGTCAAGCTGGCTAAGTGAAGTCACATCGCAGGCT  
CCCCACCTGACTAGGAAATACTGGCTTCACTGGCCTACTGGCCTACGCTGCTGGGAGCTGGGAGGCTGG  
TTGAGTGGAGCTGGTGTGAGTACAGGTGATCGAACACCCCTGGCCGGTTGAGATCAAGCGATCTGCA  
AGCCGATCTTCGAGCTATTCCCGGAAGCGGGTAGTTGAGGCTGAGGCGACAGCTGCTTGGCAGGGCGCTACG  
CCGCTCTGGCTTTCTGCTAGCGATCACGCTTCTTCCTGCACTGCTGCTTGGGATCTGCTTGG  
GCGCTCGTCTGGTGTAGGAGCTGCTTGTGAGCTGCAAGTACAGGCTAAGTGAAGTCACATCGCAGGCT  
GTCAGCTGGCTATTCTCGCTAGGCCGCTGCAATTGGCTGCTGGCTGAGGCTGGCGCTGCCGA  
CAGTTCCAGCACAAGTCCGCTGACGCTGCCGGCTGGGAGGCTGAGGAGCTGCTGAGGCGACAGCTG  
AGTGCCTGCAACGCCCTCCCGCGTCAAGGCCAGGGAGCGGTCACTCCGAAAGACCTGATGGCCAGGTTG  
TGAGTCCAGCGGGCGCTGATGTCGAGTGGAGGGTGGCCGCTTGGAGGCGGTGCGCTGGTAGGCCGCGATGCT  
GCGTTGGAAACACGACGGCATCGGGAGCTGGTGTGAGCAGAAATGTCCTGATGCTCATCGAAGATGGCAGC  
ATTCTCGTGAATTGCCGGAGTCATTGGTCTGGTCAGGCAGTGTGATGAGGATCTGAACATTGGGATCCGATGCC  
GACGCTCATGGGGCTGAGGGCTGAGGAGCTGGCATGGTGCAGGCCGGTTGAACACTCAGGGGGTAAGCAGTGG  
AGGGGGGAAACACGAGGTGGATGAGCAGAACACCCATTTGAGGAACTTCGAGCAAAGCTGAGCGCAGGCC  
CAGGGTGTAGGCTTCTTCAAGAGCGGGCATCAGGTTGCCAGGGTAGGCCGACATGGGGCGCTGGAGCAGTGG  
TGAGCTGATTGTTCTGGTGTGAAATCACGACGCTCAGATGGGATAATGTCCTGAGGAGTGTGATCTCG  
GTTATGTTGGCGGGAGCAGGTGTAATGCCGCCCTGGGCAACTCCGGAGCTGCTGAGTACGAGGATAGGGAGGGCTG  
GACGGGGTCCAGATCGATGAGGAGGGTTGCTGATGCTGCACTGGCGAAAATGACCGAGGGTTGGCGGGTGGGATT  
TCCCTACACCCCTGGGAGTACAACCGAAGTCGCTTCACTGCTACAGCCCTCAATGTGGGTGATTAGAG  
GCTGCTAAACAGACTCGTGTAAACGGAGTGGAAACCCCTTCAAGAGAAACCTACGACCAGTTGTTAACCAATTGG

**FIGURE 2P**

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TCGTAGGTTCGAATCCTACACGACCCACCA

## FIGURE 3

RL024

### DNA sequence (SEQ ID NO: 3)

```
GTGGCGCTGACCGGTAATCCCTCTGAAATTGCTGGTCGTCCCCGTGATCGGCGCCATCCTGATCGCGTGAGCAT
GATGGCAAGAAAGAAAGTGCAGTCACAAGGCCGCAACCCCGACGGTAACGTCGGAAGAAGCGGCAACCTGGCA
TCGACGGCGACAGCCCGACACACTACGCACCATCGTGGCGGAAGGCCGGAGCTCAAGGACCAGATCAGCAAGGTG
ATCCAGGAGAATGACTCGCTAAAGCCGCAATGAGAACCTGCAAGGCCGCGTCCGCAACATCGATCAGAACATCGAGCA
GAAGCTCAACAAACGCCAGGAACCTGCAAGCAAACAGCAGGAAAACCGTAGCCAGACGATCTGGACCAGGTACAGAAAC
GGCTCGAGAACCTAACCCACATTCCCAGGGCGGTGACAGCAGGACCTGGCGTGGATTTCGGCTGCGACCAAAGGATGGC
CAGCACTTCAGGGAGCGGGCTCGTCTCATCGGATATCGTCTGGATCGAGCCCCAGGACCCCGCGCGTTGATGCCAA
TGGCCAGCCGCTGGCCCGGCTCCACCAACCCACCGAGCGGATTAGCTTCCGACCTCTCGGCAATCGGTCGATC
GCGGACAGAACCGCCTGGAGCGGATCGATGACGGCTGCACCCCGTGGCCAAACAGCAGTCTGACCTGGAAAACCGCAAG
CTCGTCCGTAAGACCTACAGCTGCGAGAACTCGACGCTCATGGCTCGGTGGCCATGTTGCGCTGATCGGTGTTG
GCCGGCTGACGGGAGCGTCAATGATCCTTACCCGTTCAAATCCTCATCGGCGGACAACCTCACCGCCAACGGCATCG
AGCTGGCGACGCTCGCCGGCGGTAGCCAGCGGACTGGGACACTCTCTCGTGTGGCTGGCAGATC
CGCAGCCTCACGTTCTGTTAACGAGGGACGGTGCACCTCCGGCGCCGGCGAGGGAGTGAATGACAACCCAGAG
CAACAACAACCAGACCAGCGCCAGCGCCGACAGAAAACCATCCAGGGCGGCTCGCTGGATCAGCAGACCCCTACGGCATCC
CATGCATGCCGGTGTGCGCGATCCAATGCCAAGGAGTACCTGGCAATCAGAGCCTACTCACGGCTGCCGGGCCG
ATTGCCAAGCTCCTGGACGCCGACGAGAACACACCAGTACCGTCTTCAGCGGAACGGCACAGCTTCGGACGACCGG
AACCAACAGCAACTCGCCCTAACAGCATCCTCTCCGGCGGTGAGCGACATCCGGCAGTGGATGAACAAGTTGTACG
GGGAGGCTTCGCCGGTCTACGTGCAAGCCGGTGCAGTGCATCTGATCAGCAACTGGGATCGACTAT
GAACTCAAGGGCCGCAAGGTGATTACAGCTGAGGCCCTCATGCAACAGCAGACTTGGACTAA
```

### Protein sequence (SEQ ID NO: 127)

```
VALTGNPLLKLLVVVPGAILIGVSMGKKEQSQGAATPTVSEEAATLGINIDGDTPADTLRTIVAESRQLKDQISKV
IQENDSLKAANENLQGRLRNIDQNEQKLNNTAQELQQQENRSQIILDQVQKRLENLTHIPEAGDTDLPVGFVVRPKDC
QHFQAGGSSSDIVWIPEQDARVDANGQPLAAGSTTQPSGFSPFTSGNAVDRCQNALERIDGLHPVGGQRSDLENRK
LVRKTYTLPQNSTMGSVAMFALIGRVPVDGTVNDPYPFKILIGPDNLNTANGIELPDVAGAVASGTASGDWTLSCVRGQI
RSLTFVFDGTVRTFPAPAEVNDNQSNNNQTASADQKTIQGGLGWISDPYGIPCIAGDRRSNAKEYLGNQSLTAAGAG
IAKLLDADENNSTVFSGNGTSFGTTGTONSNSALNSILSGGVSDIRQWMNKLYGEAFAAVYVQPGARVAVHLDQQLAIDY
ELKGRKVVDYSSGAAHATADLD.
```

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**FIGURE 4**

**RL025**

**DNA sequence (SEQ ID NO: 4)**

```
ATGATCCGGAAGTCGACAGGCTCGCTTGCTAATGCTTGCCTTACCCACACTGGCCACGCGGTGGAGATTCTGCGCTG
GGAGCGCATTCCGTTGGCATTCCATTGACGGTCGCCAGGAACGCAATTGTTTCTGTCGACAGAACGTGGAGTTGGGG
TTCTCGGGATCTGCAGGGCAAGCTCGCGTCCAGAGTACCGGGCGCGACTCTACCTGCTCGCCAACGAGGCCATTCC
CCAGCGCGCTCGCCTACAGGACCGACCAATGGCAGCAGATGCTCATCGATATCGCCGCCACCGAACGAAACGGCCGA
CCAACAGCCGGAGGCCGTCAAGGATCGTCGCCGGAGCCAGTGGATCCGCAATTGCGCAGTCCCGGGAAAGCCCAGC
CATCGGAGCGCAGAACAGACCGAGCACGCGAGAACAGCAGCGAACAGCCGTCCCGCGCGAAACGCCGTCCCGTGGTTCTG
ACCGCCTATGCGCGCAGATGCTCTATGCCCGCTTCGCACGGTGGAAACGGTGGATGGCGTCGGTCAGGTGCGCGTCAA
GGCACAGCTGACCTGACCCCTGCTCCCGCTACGGCTACGGCTTGGCGCCCTGGCGGTGACGACT
ACTACATCACGGCGGTGAAGCTGCAGAACGCCAGCGCCACCTGGCCCTGGATCCAGGGACCTGATGGCAATTTC
GTCGCCGCGACCTTCCAGCACCCGTACTTGGGGCCCGGGCGACGCCACTACCGTGTATCTGGTACGCG
CGGCCGCGCCCTGCCGACGCCCTCCATCAGCCAGATCGATCCCAAAGGAGGCCGTGGCGCTGACC
GCTAA
```

**Protein sequence (SEQ ID NO: 128)**

```
MIRKSTGSLLMLALPTLAHAVEIILRWERIPLAIPLTVGQERIVFVDRNVRVGVPRDLQGKLRVQSTGGALYLLANEPIP
PARLRLQDATNGEQMLIDIAATEATADQQPREPVRIVAGEPVDPHYGQSREAQPSAAAKQTEHAEAPKAVPRTPVVVL
TRYAAQMLYAPLRTVEPVDGVGQVRVKRQLDLTLLPSLPITATALGAWRLDDYYITAVKLQNQNASAQHLALDPRDLMGNF
VAATFQHPYLGPRGDASDTTVYLVTRGRGLADALLPSSISQIDPKGGRRGADR.
```

## FIGURE 5

### RL026 : DNA sequence (SEQ ID NO:5)

```
ATGAGTTTCAGAAAACACACTGCGCAACAGCAGGCACACATCAACACCTTCCGGTTCATCACCGGTTCTGTGCATGGT
CATCGTTGTGCTGCCACTCGCTCTGGAAAGCCGTAAGGACCTCTGGATCACATTCCGGCCGACTTGCCTCAGGAA
GCACCCGGTTGTGCTGGGACATTCGCCAGAGAGCCTATGGCTTCGGCTCTACATCTCCAGCAGGTGCAGCGTTGG
CCCAAGGACGGCGAGGTGGACTACAAGGAAACCTGTTCCGCTACGCTGCCACTCCACTCCCTGCAAAGTCTTCCT
GGAGAAAGACTTTGAGTTCTGCTGTAACGCCGGCGAGCTCAGGGTCGGAGCGCACCACCTCGGAATCCCCGGTCAG
GCATTGGCGAGACCAATGGCCGCGTGAATCCAGCACTCGATCAATGACTGGACCGTCACTTGGACATGGACAGCACGGAG
TATTACGCCGGCGAGAAAGATCAAGCGGGCGCTGGCCGCTACCCGTTGCACGTTATCCGCCCGACGTCGACCCGGAAAC
CAATCCCTCGGCCCTGCACTGGACTGCTACTCCGACACGCCCTAACGTATCGAGCTTGAGGAGGCCGGCCCCACCA
AGCGGGAGGGAGGTCTATGA
```

### Protein sequence (SEQ ID NO: 129)

```
MSFRKHTAQQQAHINTFRFITGFLCMVIVVAYCVWEARKDLWIHIPPDLRSGSTRLWWWDIPPESVYAFGLYIFQQVQRW
PKDGEVDYKGNLFRYAAYLTPSKVFLKDFFRRNAGELRGRERTTSEIPGRGIGESNGRVIQHSINDWTVNLDMDSTE
YYAGEKIKRALARYPLHVIRADVDPETNPFGLQWDCYSQRIELEPPAFTKREGGL.
```

**FIGURE 6**

**RL027**

**DNA sequence: (SEQ ID NO: 6)**

ATGCCCGAAGAACATCTGTTCAAGGATGGAACCCCTCAGCTTCCTGCCGACCC  
GTTTGAACCGGCAACCGGTAGTCATCGG  
CGGCCTGACCGCAGACGAAATGTGGATCACGGTCTTCACCAGCGGAGCAGCC  
GGGTTCGTTCTTGGCATCCGGCTGCCT  
TGGTCGCAGGTAAACGCTGCCTGCATTCCACTGGGCGCGCTGCTGGTCGGCGC  
CCTCGGCCTAGGTATCGGCAGCCCGC  
CTGCGGCGGATGAAGCGGGGGCGGCCGATAACCTGGTTCTACCGCCAGGTGG  
AGATGGCCCTCTCGCTGCCTTCCCGT  
CTTCGGCAACCGTGCCTGGTTACCGCCTCCGGCGCCTGGACCAGTCGACGC  
ACGGAGTCCCCATGA

**Protein sequence: (SEQ ID NO: 130)**

MPEEHLFQDGTLSSLPTRLNRQPVIGGLTADEMWITVFTSGAAGFVLGIPAALV  
AGNAACIPLGALLVGALGLGIGSRV  
LRRMKRGRPDTWFYRQVEMALSLRFPVFGNRRLVTRSGAWTSRRTESP.

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**FIGURE 7**

**RL028**

**DNA sequence: (SEQ ID NO: 7)**

```
ATGCTGAAACTCACCTCCAGAAACTGTCCGCCCTCTGCCAGAGCCTGGCCGCATCACTTGGCGCTCCCGGTATCGC
CTTGGCTGCACTCCCCAAACCGAGGCACCTAGCCGTGGGGAGGGATCGGGCATCATGCAAACCATCCAGAACTTCGGCT
ATGACGGAGCGATGCTCCTCGCGCTGCTCATCTGCGCGGCTGCTTTCTGGGGTCGCTTGCATACCTACGGCACCTAT
CACGCCATCCATGACGGGAAGAAGAAGTGGTCGATCTCGGAGCGGCGTAGCCGTAGGTGTCGGCTGCTGATCTGAT
CATTATCTCGTCACCAAAGCCACCGCCATCATGTAA
```

**Protein sequence: (SEQ ID NO: 131)**

```
MLKLTLLQKLSALCQSLAAITLALPGIALAALPKPEAPSRGEGSGIMQTIQNFYDGAMLLALLICAALVFLGVAWHTYGY
HAIHDGKKKWSDLGAGVAVGVGLLILIIYLVTKATAIM
```

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**FIGURE 8**

**RL029**

**DNA sequence: (SEQ ID NO: 8)**

```
ATGAGCATGAGCGGAGCCCAGACATCAGCGTTCCAGGCCGCGCTGGTTCCCCATGGCCGGCGAGGGACTGTTCAT
TGGAGCAGCGATGACCTTCCTCTGCTGTGGTCGCGCTGGCGATGTACAGCACCTGGCGGGCTGGCCACCAACAACC
TTCGACAGCGCCACCGGTGGCGCTCCCGATCCCGATCTGGTCTCTCGGCATCACCTCTTCTTCTCTCAGCT
GACCCATACGGAGACACTCATGCTGAAACTCACCCCTCCAGAAACTGTCCGCCCTCTGCCAGAGCCTGGCCGCCATCACTT
TGGCGCTCCCCGGTATCGCCTGGCTGCACTCCCCAAACCGAGGCACCTAG
```

**Protein sequence: (SEQ ID NO: 132)**

```
MSMSGAQTSQAAAGFPPSAGEGLF1GAAMTFLLLWSAWAMYSTWRGWATNNLRQRHRWRFRDPGSWSSSASPLSSSA
DPYGDTHAETHPPETVRPLPEPGRHHFGAPRYRLGCTPQTRGT.
```

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**FIGURE 9**

**RL030**

**DNA sequence: (SEQ ID NO: 9)**

CTGATCTGCACGAGATTGCCGTGAACACTCCACATCCATCCCTCGCCGAAGCTGCCCTGGCGTCTTGGCTGCAGTGC  
GCTGGTGCACAGGGAGCTTCGCAGCGAGCGCTCCGAGCAGGGGAACCTGGAGGTGATGATCCGGCAGCTCAACGCC  
TCGAGGACACCGCCCGCCGAGTGCCAGGGCGCCGATGAGCCCGGACAGCGCTTCACTTCGACTACCCCGCCTGCC  
GCTGACCTGCAGCCATCCGCAAGGCCCTGCAGGACTACATGACGCCAGCCGCCAACCGCGTGAACCTTCCGACTT  
ATCAGGAATTACACCCCTGCGCGAGGGCGATGCCATGA

**Protein sequence (SEQ ID NO: 133)**

LICTRFAVNTPHPSLRRSCLAVLACSLVVAQCAFAASASEQANLEVMIQLNAEDTARRSAQGADEPGQRFYFDYPRLA  
ADLQRIRQGLQDYMTPSRAQPRDPSDLSGNYTLRGGPMP

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**FIGURE 10**

RL031

DNA sequence: (SEQ ID NO: 10)

ATGAGCATAAAACAGCCCTTCGAATACCATGTCAGAACATCGTCATTCCCTACAAAACCCCTCACCAAGGGCGTCGCGAT  
GTTCAAAACACAAAGAAGACACCTTGGAACCCGACGACCACGCCCTGCTCAACCCCTCTGCGCTGGGCCAGGTCGTGCGTC  
TGGGCCAGGAAGGCTGGGAGCTGGTGAGCGTTCAGCCACTCATGCGGGCGTAACCGAGATCGGTAAATCAAACGCCAA  
GGCTGGCTTGGGCCGTCTGCCGTCAAGTACCTGCTTTCAAGCGCGAACCTCATAA

Protein sequence: (SEQ ID NO: 134)

MSIKQPFYHVENIVIPYKTLTKVAMFKHKEDTLEPDDHALLNPLRWAEVVRLGQEGWELVSQPLMRGVTEIGNQNAQ  
GWAAGVALPVSYLLFFKRATS.

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FIGURE 11

RL032

DNA sequence: (SEQ ID NO: 11)

ATGCTTAGAACATCTCTATTGGAGTTTGCTAGCCATGGCTGCTATGTTGGCAGTTATGGGTGGCTGCCCTACATT  
ACGATGCGGGTCGCAATTGTTAGTGAGGGCGACTTGATTGATGTGCTTAGAAAGTGCGGCAACCCCTGATAGCCGTA  
AAATTGAAGGGCCCGCAGTGGATGGTATAGTGGCTATATAGTGGCTGCTACTGTCGAAAATGGGTATATGGACCA  
AGGAATGGATGGTACCAAGCTTAGGTTGTCGATGGAAGACTAGTTAGATAAAAGGCACTATGGACTAG

Protein sequence: (SEQ ID NO: 135)

MLRNISIGVLLAMAAMLGSTYGVAAATLRCGSA1VSEGDLIDDVLRKCGNPDSRKIEGPAVDGSGYIVRGAATVENWVYGP  
RNGWYQKLRFVDGRLVQIKGSMD

FIGURE 12

RLO33

DNA sequence: (SEQ ID NO: 12)

```
ATGAAACTTATCCTGATTCGACGGACGCCCTCTAAATCCAAGCAACATGCTAGAGGCCCTATCAAAAGCAGGAAAAAA
TACAAGCATCAGCATAAAGCAACGGCAAGCATTAAATATAGAAACTCTTCTCAAGGCAACAACCACTGCAGAAAACACAA
AAAACCTCTCAACAACCTTCAACGGCGCAGAGCTGACTGCTAACACCTTCAGCAAGTCATAAAACTCAGCAGGATCAGTA
ACCAGAGTATCCACAACTAGCGCACAAGCATTAAATATAACACACTCAGCAGGCAACTCAAA
GAATTTAGCGCAGAATTCAATGGAGGCCAACTCAGCGACAACCTACTTAGAGCAGTAATGCGGCAAGGAACAAACA
CCAGCATAAAGCGTCAATAACCCACAAGCGGCAAAATAACGCCCTTCTCAAAACTATTCAATGCAAGCAGGTGACACAAA
ACATTCAAGCGCAGAGTTCAATGGCGCTCAACTTACTCAAAACAATTCAACAAGCTTAGACGCCAGGAACCCGAAC
ATCCATTAGCGTCAATACCGCACAGGCAGTTAATATAAGCACCCACTAGCCCTCATCAACTCTGCCAAAGACACGAAAA
AGTTTAGCGCCGACTTCATGGTGCACAACCTAACAGCAGACAACCTTCAGCAAGCGATAGCGCTGCCGCTCGGTAC
AATATCAGCGTCAACACCGCTCAGCGGCAATATATCACCCTTTACAGGCCATCAACATCGCGGCAACACTAAAAA
ATTCAAGCGCCAACCTTAATGGTGCCAACTCACTTCAAAACAATCCAGCGGCGCTCGAGCGACAGGATCAAACACAT
CAATCAGCATGAACCTCGCAAAATCGCAACCAAAAGCACTCACTTGAACCTCTAGAGCATAGCAAGTTCAAGCAA
TTCCAAGCCAATTACACGGTGGCATGCTAATCGAACAACTACAACAGATAGTTTCCCGTGCAGGCCAGTACAA
CCGTGTTATTCCGACGCAAAAGCCTACCAATCGAAATATCCTTACCCCTATATCATCTGCCGGATGAGACTTATAG
CCGTGGATGAAAACACACCATCCACGGCTATACCCCTAG
```

Protein sequence: (SEQ ID NO: 136)

```
MKLILDFDGRLLNPSNMLEALSKAGKNTSISISNAQALNIETLLKATTAAENTKNLSTTFNGAELTANNLQQVINSAGSL
TRVSTIAAQAININTLSSAISTAGNSKNFSAEFNGAQLSSDNLLRAVNAAGNTTSISVNTAQAAANITALLQTIHAAGDTK
TFSAEFNGAQLTSNNIQQALDAAGTRTSISVNTAQVNISTLLALINSAKDTKKFSADFNGAQLTADNLQQAISAAASGT
NISVNTAQAAANISTLLQAINIAGNTKKFSANFNGAQLTSNNIQQALRATGSNTSISMNSAQSANQSTLLELDIASSSKQ
FQANYNGGMSNPNNLQQIVFPCCRQYNRVYFRRTRPTNRKYPYPIICRMRLIAVDENTPSTAIP.
```

## FIGURE 13

RLO34

DNA sequence: (SEQ ID NO: 13)

```
GTGCAGTGGACTCACGAACAGTCACCGATCATCAGTCAGTCAGTCAGGCACCGAAGAGATCCTGGTGCAGCCTTCGCAGGCAGTGG  
CAAAACTACCAACCCCTGGGCTTTGCCAGGTGCAACCCCTACCCCTGAGAATCCTCTATCTCTGCTACAACAGCTCGGTGG  
AGAACAGCCGCAAGGGCAAGTTCCCGCAACGTTAGTGTGCAAGACCCGCCACAGTCGGCTCATGGGTGTACGGCATT  
CAAGTACGCCACAAGAAGACGAAGAACCTGCGACTGACCGATATGCCCGCGACTCGATAACCCAAAGACTGGGAGTTGGT  
ACGTGACGTGCTGGCACGCTGAAACAACATAGGCCAGCGCCAGCGAAACTCGGCCGACCGCACTTCCCGCTTC  
GCGACAAGCGTCTCTCACCAAGTGGCTAGGAACGCTTCAAGCAGGGCTGGACATGGCGCAGTAGTCTGGAGGC  
ATGGTCGATCTCCAGGACACCGCATGCTGATGCCCTGACGGTACCTGAAAGCTGTATCAACTGAGCAAGCCGATT  
GACCCAGCGCTTCGACTGCGATGCTCTGGACGGGGCAGGGACATCAACCCAGTGTGCGGACATTGCCCATGGCAGC  
GCATCAAGATGGCTATCGTCGGGATCCCGATCACCGAGCTACCGGTTCAAGGGCGCAGAAGATGCCCTGAAACAGCGAC  
TGGATGGCCGGCGCCAGGGAGACTACCTGACCCAGAGCTGGGATTCGGCGATCGCACACGTGGCCAACATCAT  
CCTCTCTACAAGGGCGAAACAGGAAACTTCAAGGACTGGTCCGAGACGGTGGTAAAAAGTCCCTCCGCGGACC  
TTCTCACCGCACTTCATTACCCGACCGTTATCGCGTCTGAGAATGCCCTGAGCTGGTCCGAACTCATCGGAG  
CCCAATTCCACTGGTAGGCGTATCGACAGTTACTCGCTGCGGACCTGGAGGATCTGACGCATTAGCCGAGGC  
GCGCCAAAACGTCAGAAACAAGAAACTGTCCTGTGACTACCGGACTACACCCAGTACGTGGAGATGCCGAGATCAGCC  
AGGACCGTGGAGATGCTTCGTCGATCAAGATCATATCGACCTACCCCTGATCTGCCGCGATCCTTGAGCTTC  
CTGACCCCTTGACGATGAGCTGGACCAACAATCACCCCTGACCCGACACAAGGCCAGGGCTGGAAATGGGATTC  
TTGCGTGTACGACGACTTCAACGCGGACCGCTGGCCCCGACACCGACCCAGGCAAGCGCAGATGAGTTGAACCTGA  
TCTACGTGCACTGACCCCGCGATGAAGATCTTGTCCATCACAGCCTGGTGTGATCATGCAGCGGTACGTGGAC  
GACAGAAAATGAAGGAGCAGATAGCTGTAAAAATGA
```

Protein sequence: (SEQ ID NO: 137)

```
VQWTHEQSPIIQSKAPKILVRAFAGTGKTTLGVFARSNPTLRLYLICYNSSVEKAAGKFPRNVVCKTAHSLAHAVYGI  
QYAHKKTKNLRLTDIARGLDTQDWELVRDVLATINNYMASADAELGRPHFPRFRDKAFLTSQAERFLKQGLDMARVVWR  
MVDLQDTGMLMPLDGYLKLYQLSKPDLQRFDMLLDEGQDINPVIADIAHWQRIRMAIVGDPHQQLYRFRGAEDALNSD  
WMAGAEEHYLQSWRFGPAIAHVANIIILSYKGETRKLQGLGPQLVKKSLPPDLPHTFIHRTVIGVIENALQLVRNHPE  
PKFHVVGGIDSYSLRDLEDLYAFSRGLRQNQNKLLRDYRTQYVEIAEISQDGEMLRSIKIISTYPDPLPARILELRS  
LTLDDELDATITLTTAHAKGLEWDFVCLYDDFNADPLAPDTDPGKRDDENLNIYVAVTRAMKILAINSLVLSIMQRYVD  
DRKLKEQIASCKK.
```

## FIGURE 14

RLO35

DNA sequence: (SEQ ID NO: 14)

```
ATGTTCGGGTCGCTGATCGGCGCAATCATCGTGGAGTGGGTATGCCGTATTCTCTGGCCTGACGCCGGCTGGAAGCA  
TGCCCAGGCCATGTTGAGTACGAACTCAGTTGGCTGTCGCAGGGGCTGCTACACAGCGTCGTGCAAGGAGCCAGGTC  
GAACCCGCCACCTGGCTGGGCCAGTTGGCTATGACTGGTTGCTGAAAGACCGGGATGGTCGACTGGATGACCAACATG  
ACTACCATCGCGCAGGCCGGCCACGGGAGCCCCGCTGGACGTTGCTGCTATCTCACCGCCCACGGGTGCTCCACGCTGCAGAA  
CTACGGCCTGGCCGCGCTGTAACACGGTGTGACATTGTCGTGCGCCTGGTGTACCTGGTCATGACGATCCCCTTATTG  
TGATGGCCGCGTTAACCGGCGTGTGGACGGCGTGTGCGCCGGACCTCGCGCAAGTTGGCGCCGGCCGGAGTCCAGC  
TACCTCTACCACAGCGCGCGCAGCATCATCCGCTAGCGTCGTCCCTGGACGCTACCTGGCAATCCCCATCAG  
CATCAATCCCCCTGCTCATCCTGTTGCCCTGCCGCGCTGCTGGCGTAGCGGTATGCATCACAGCATCCACCTTCAAAA  
AGTACCTGTAG
```

Protein sequence: (SEQ ID NO: 138)

```
MFGSLIGAIIVEWVCLYFFWPWDAGWKHAQAMFEYELSWLSQGLLHSVVVQEPGRATWLAQLAYDWLFVKTGMVDWMTNM  
TTIAQARPRSPLDVRYLTAHGVTSLQNYGLAALYTVLTFVVRBVLVLMVTIPLFVMAAFTGLVDGLVRRDLRKFGAGRESS  
YLYHKARGSIIPLAVVWPWTLYLAIPISINPLLLPCAALLGVAVCITASTFKKYL.
```

FIGURE 15

RL036

DNA sequence: (SEQ ID NO: 15)

ATGAAGTTGAAGAATTCTTACAGCCTTGTATAGCGGTTCTCCACTCCGAGTCGCGCTCAAGCTGCTCCGATGCTCGTGGCGCCTTGTATGTTGCGTCTATGAGCCTGATATTCACTGGTTAAACCATCAGGTGTCCTCACTGGCAAGCTATGAATGTCGCTATGAGCAGCAGCTTATTCAGCAGGCTGCTCAACGACCCGAAACATGTGAGCATCTGCCGTTGAGTGA  
GGCAATGTCGCTGCCCTTGGCGGGTAGAGCGCTCTGCAACGACCCGAAACATGTGAGCATCTGCCGTTGAGTGA  
CGGAGGGCGAGCTGCTATTGACCGCTCGCACGCTGGTATCTCGGGAAAAGCGCTGCGCACTGATGATCTGGTCG  
ATACCGACAAAGGCCCTCTGTTTACCGCTTACCGGGATGGTAGCCGCTTCAGCAGGATATCCAGCACGATAACAAA  
GAGGTGACCGAGCTTGTGGCACTCGCTGGCGCTGTTCACTGGTGACTCGCTGGTACCCCTCAACGGCTGTA  
CCTTTTGAACTCTTGGCGATGAGCCGGCGAGGGGTGGCTAGGCTGGAGATTCTCGGCAAGACCTCGATGATGTTGCGCCGGAATGATGCCGAAACTACATGCTGCTGGATCAGCATGGCAGGTGCTACTCGCTACGGACGCAGAGCGCTG  
GGGAGCGGTGCGTGCAGCCTTTGGCTGGAGACGGCTTCGGTTATCGGTGCTGGCCCACTGCCGAGCATATGGT  
GCTTTTCCACACGCTGGCTTCTCGAGCTGGATCTGATCTATCACATCGGTATCGTCGCTGTTGCTGGCTCTGTGGC  
TCCCTCTGTTACTGCTCTGCTGGACTCGCAGTCGGCATCTACTGCTATGGCTGGCGAGCATCGACGCACGC  
TTGATAGAGCCGCAAAAGCAGCCTGAGCATTGAGGAGAGCGAAGCTTTCGGCTGAGCTTATCAGCCGCG  
CGTCGCGCTCTGCGTGTGCGCACGCCAGTGGCTCTGAAAATCCCAGCGCCCAATGGCTGGTGTGATA  
GCGAGGCAGTGGCCACCGACGCCAGATGGATTCCACGGCTTCGCAAGGAGCTGTGAAGTGTCTGGAGAAACTG  
GAAACCGAGGCAGGGCTACATCTTCATCTCAATTACAGCCCACCGCTATAACGGTGAAAGACGTATTGTTGCGCCTT  
CAGTGAATCAGTGCAACCAAGCGGATGGAGCGGAACCTGGCTCGCAGAAATCCCTGGCGGATGCTGCCAATGAAGCCA  
AGACGCTGTTCTCGCCACCATGAGCCATGAAACCTCCGACACCTCTGACGGCATGCTGGCACGCTTGAGCTGCTTGGG  
CGTACCGAGCTGAGTGGCAGCAGGGCTTACCTAAGGCAATTCCAGCATTCTCGTCGACCCCTGCTGCACTGATCAG  
CGATGTGCTTGTACGTAACAGATAGAGGCCAAGCTGGACCTAGTGGCTGGAAATTCTCCCGCTGGAAATTGACCC  
AGAGGGTCTGCACTGCTTACCGGCTCCGCGCAGGCCAAGGGGCTGAGTTGATACCTGCTCTGCGAGCTGGC  
CTGCGCATCGGGGGGCCGCGCTGGATCCGCAGATTCTCAACAAACCTGCTGAGCAAGCGCTGAAGTTCACCGACAA  
TGGCTATGTCACCGTCCACCTGAAGGCCAGCGTGGCTGATGCCGAATGTTGATGCTGACCTGGCAGGTCAACGATACCG  
GCATGGGATCAACGTCAGGGATCAGGCCGCTGTGCTGAACCGTCTACCATGCGCTCCGAGCATCGCTCGCA  
GGCACGGGCTCGGCTTGTGATCAGGCCAGCGCTCCGCGACTAATGAATGGCAGTCTGAAACACTGGTCACTGAGCTGG  
GTTGGGCGAGCTTGTACGGCTCAGGCTTGTGAGCGGATCAGGCTGAGCCGAGCTGGCTGGAGCTGGCG  
CGTCTCAAGTGTGCGCTGTCCGCCACTAACGGAAATGCTGTGGCTGGATCTCCCGTGGGGTGGAGGGGCGCATG  
GTCGCGACCCGAGGTGCTGGACGCCAGCTCGCTGGCAATGGCTGAGCTGGCG  
GTTCGAAGCATGGCCAGGATGCCGGTGGAGCTTCCCTCAGGTGATATGGAGCCGAGGCCACAGGGCCGACTGGC  
TGCTCGGGCTCAACAACTGAAACGGCTGCTCGATCGTCTCTGGGCTTGGCCCATGGCGTCTCGCTGATCCTCGACGCC  
CGGATACGGCTGGCTCCCTTGGCAATCTAGGCTCTCCGCTCTAGTGGTGGAGGATAACGCCATCAACCAGTGTATCTT  
GAGGGACCGAGATGGAGGCGCTGGGCTGAGCCGAGCTGGCTCTCGATGGTGGAGGCGTCTGGCTGACTGCCAGACGG  
CTGCTTCCGACGGTGTGCTCACCGATATAACATGCCAACATGAGCGATACCGGCTAACCGGGAGCTAACCGGGCCAA  
GGGTTCCGCCAGCCGATCATGGGCCACGGTGAACGGCATGGTGTGAGGAGGCCAGCGCTGATGTCGCGGGGATGAA  
CGATTGCTGGTCAAACCGGTGGATCTGAATGCCCTCAGAAGCTGTTGATTAATATTCTAAGGTGGATCGATGAA

Protein sequence: (SEQ ID NO: 139)

MKLKNFLQPFDSGFPSTPSAALKLRLMGGALMCLVLCLSLIFSVSMVLNQVSLSRQAMNVAMYEAQLYFEQREALLNHLS  
GNNVPLAAGRALVNEAPPNNVSILPLSDGGRRGLLTTARTLGLDLREKRALMLYLVDTDKGLPVYRLTADGRPSAISSTITK  
EVYRALLATPSAPVHWVTDGGTPQRQLYLFESLGDPEGEGWLGLEILGEDLDSMLRRNDAGNYMLLDQHGQVVLATDAEAL  
GSGASRTLRLRGDGFGFIGAGPLQPQHMVLFQHVGSSWDLIIYHIGIRLLLALWLPLLALASALALAVGILHLWLVRSIERR  
LIEPAKRRLEALKSEAFSRAVIQAAFPVALCVLRRADAADVLENPQARQWLGDSEAIAHDAWPRWISQAFAGGVKCSGEEL  
ETEAGLHHLNNTPTTRYNGEDFLVFCAFSEISARKMEEAELARAKSLADAANEAKTLFLATMSHEIRTPLYGMLGTLELLG  
RTELSRQQAGYLKAIQHSSSTTLLQIISDVLDSVSKIEAGQLDLECEVFSPLELTEEVVQSFAGAAQAKGLQYVTCLSAELP  
RLMRGAAASIRQI1LNNLNSNAVKFTDNGYVNVHLKASVNVDAECVMLTWQVNTGGMINVVEDQPRLFEPFVYQIRRSEHPVA  
GTGLGLSISQRQLAMNGSLSKLVSEI1GLGSSFSLRLPLERIAMAQEPODLAGCAGVQVLAQVRLTCELCGWISRWGGGRAM  
VATPRSLDEADATSLLVKVLVLLLEGAPMFEAWPGCRVELSPQGDMEPQAGRDWLGLNNLNGLHRALGHLADPSTP  
PIRLAPLRNLGLRVLVVEDNA1NQLI1RDQMEALGCSVELLFDGREALLHQCATAFDVVLTDINMPNMNGYELTAELRQ  
GFRQPI1GATVNAMREERERCMSAGMNDCLVKPVDLNALQNCINILKVRD.

FIGURE 16

RL037

DNA sequence: (SEQ ID NO: 16)

ATGAGCTGGAAATCTTATCGGGTGGTGGTCGAAGATCAGCGTTTCAAGCGGAATACCTGCTCAACCTGTTCGCGA  
GCGCGCGTGCAGTACCTGTTAGGTGCGGCGACCGCGCGGGCTGCGCTGCGCTGAAGCAGGACAGGTTGCGACCTGA  
TCCTCAGCGATCTGATGATGCCGGCATGGATGGTATCCAAATGATCCTGCACTGCCGTATCTCAAGCAGTCGCGAAG  
CTGGCGCTGATGAGCTCCTCGCAGCGGATGATGCTCAGTGCAGCCAGCGGGTCGCCAGAGTCTCGGCTTGTGCGTAAT  
CGACCTGTTGCCCAAGCGGACTCTGCCAAGGCCATCGGCCAACCTCTGGAACACCTGGAAGATGCCCTCAGGAGGAAGC  
TGGAGCCGAAACCGACGAGACTCCGCATGGGCCACGGCGTTGCTGGATGCCCTGCATAACCGAGCAACTGGTACCTGG  
TTCCAGGCTAAGAAATCCCTCCACACGGCGCATAGTCGGCGCCAGGGCTTGATACGCTGGAGGCCACCCGAGCATGG  
CCTGTTGCTGCCAGCTGTTCATGACTGATGTCAGCGCTACCGGCTCTGCAAGGCCCTTGCCTGCGCGTGTGAAAC  
AGACCCCTGAACGCCAGGAATCGTGGCGCAGGGGGTTACGAGATTCCGTTTCGGTGAATCTGCCGCCACCTGCTC  
GATAACCAGGAACTTCCGGATCGACTCTATGAGTACGTCGGCGCTCGCGGGCTTGTACCGACTCACTATGTTGAGTT  
GACCGAGAGCAGTGTCAAACTCTGTCAGTAACTACTATGCAAGGTGCGCTTGCCTGCGCATGAAAGGGTTGGATTGG  
CCCAGGAGCAGCTTGGCCAGGGTACAGCTCGTTCTATAACCTGGTCACGGACGCCCTCACGGAGCTGAAGATCGACCGC  
TCCCTAGTCCAGGGATGCCAGAGGAACCGGCCCAATGCACTGCACTGCTGATTGAGTTGGTCAACCGCCCTGAA  
TCTCGACGTGGTGGCCGAAGGCGTGGAGACCTGCGAGGAACCTGAATCTCTTCGTCGCTTGGCTGGACGCCGGCAGG  
GTTTCTGATTCTAAGGCAGTGTCTGCTGAGTTGAGCGCAGTTAAGGGAGGACGGCCAGCCTCCTGTTAA

Protein sequence: (SEQ ID NO: 140)

MSWKSYRVLVVEDQPFQREYLLNLFRERGVQYLVGAGDGAELRCLKQDRFDLILSDLMPGMDGIQMIQLQPLYLKHRPK  
LALMSSSSQRMMLSASRVAQSLGLSVIDLLPKPTLPKAIGQQLLEHLERCLRQKLEPETDETPHGRITALDHNEQLVTV  
FQAKKSLHTGRIVGAELIRWSHPQHGLLPLPSCFMVDATGLHEALLWRVLEQTINQESWRRAGYEIPVSVNLPPLH  
DNQELPDRLYEYVGARGACTSSLCFELTESSVTLSSNYAGACRLRMKGFLAQDDFGQGYSSFYNLVTPFTELKIDR  
SLVQGCVEDNGLNAAVISCIELGHRLNLDVVAEGVETCEELNLLRLGCDRAQGFLISKAVSAREFERQLREDGPSLLV.

## FIGURE 17

RL038

DNA sequence: (SEQ ID NO: 17)

GTGAAGTCTGCTAGTGCCTGGAGCACGACAACAACTTTGCTCAAATGGACAAACCCCTCTCCAGAGCTGAGCATCGG  
CTTGATCTGTGGTGGTGTGACCGTATTGCTTCTGCTTACTGGTCGCTGGGAGATTGTTCAGGAGGAGG  
AGGACAAAGTCTCTTCACTTCAACCGTATGATGGATGTTACCGGAGCATAGGGTATTCTTCTGGCGCATCGCTCGA  
AAAAGCGCAACAGGACCAACCCAGAAGTACGACTATGACGTGTGCCTTGCAAGCGCACTTGTGCAAAGGAAACGGATT  
ACGGCTCTATGAGGGACGGAGATTCTCTTGTCTGCACTTACTGGCTACCAAGCAGCGCTGAGCGCCGATTCT  
CGGGAGATCGCTTCTGCTGGTGTATTGCTGCCAATTCTACCGGAGATTCTGGAGTGTTCGCGCTATCCGCGCCA  
CAGTTACTGATCTTGTATCTTCCGGCAGCACCCGCCGTGCACTGGCGCTGATCTTCCACAGCGCAGCGTACAGGTT  
GAGCGGAAGCTATCCGATGATAGTCGAGCGCATTCTGGCGCGCTGCGCAGCCACCCGGGTGGGGAGGACGCTCAGCGTG  
TCCATTGGATACCGCTGATCGTATCGCAGTCGGCTGGAGATGTTGGAGTCGCCGGGTTGATCTGCCGAAACA  
CTCTGGTGGCACGACGAGCGAACATCTGATCATCGCTGAGGCTGCTTGATCTCAGGCGAATCAATGACTTCGAACA  
CTTGGTTGAGCCCCCGGATTCTGATTGCTACAGCGCTGGTATCGCCGGATGGCGAGGTTATTGCTCGCGCGGGCCCTGCGA  
CCGGCCTGAGGGATGGCTGAACCTCACCCGACAGGGGTCGCCGTCACTGCTCAGGCCAGCTGAGAACAGTGGCTC  
GGCTCTACCGAACCGACTACGGCAATTCTTCTGCCACTCCGGTGGCTGGTGGAGTCTGCTGAGCCGGCGCT  
-GCTCTGGCGGTTGGCTGGGATCGCTGGTACACCGAGCTCAACCCGCTCACTGGCGCAGGGCAGCCGCT  
TGGAGAGCGACACCTTCAGCGGAGCGTATACAGACCCGCCGGTGTCTGGTGTGCTGACCCAGGATGACCGCAA  
CTGGTGACCTGCAACCACCTGGCGCCAGTGGCTGGCGGGCCACGGAGATCTTGGGCTACTTCAACTCGAAGCT  
TTTCGATGCGCTGGCGAGTACCGAGAGACATCTGATTCAGGTGGTGGCGCTATTGCGACAGCCCTTCGCGGCA  
CCCGCATTCGGCGACCCAGGGCGTACTCTGCGTATTCAACGACATCACGGTCACTGCGAGGGAGACCGCGCTGCC  
AATCGGAAGGAGCAGCGGATGCCGACCGAGGCCAGGGCTGCTGGCTGGCGGGCCAGGGCT  
CTCTGGTACGGTGTCTTGGCACCTTGGAGATTGCTCGACCTGACCCCTGAACAGCGGCCAGGGCTACCTACGACCA  
TCCAGAGTTCTCTGCGAGCTCATGCACTGATTAGCGATGTGCTGGATGTCAGAGATCGAACGGGGCAGATGGCT  
CTGACCCCTGGCGCCTCAATCCGCTGGAGCTAGTGCAGGAACTTGGCAGCGCCAGGGCATGGCCAAGGAA  
CTGCACTTCTATGCCCTGATCGACACCGAAGTGCAGGCGCAACTGATCGGTGACGTGACGGGATTGCCAGGTGCTCA  
ATAACTTGGTGAATAACCGCTGAGTTACCGGATATCGACGGGTGCTCTGCCGTGAGTTGCTCTCCGCAATGAT  
GGTCTGAGGGCTTGTGCTGGCAGGTCGGCGACACCGTATCGGTATCGCACACCGAACAGCAGGAGCGCTTGTGAGG  
GTTCTACCGAGTTCTGGAGCGCACCATGCCGGCGCACGGGGCTAGGACTGTCGATCTGCTGCCATCTGGGAAATGTA  
TGGCGCTGACCTTGCAGGAACTGGTCAAGGGCTCGCGACAGCGCTGCCAGCGCTGCCAGCTGGTGTCTGGAGTTGCC  
CAGTCCGGCTGGCTTGGCGGGCTTGTGAAATCCGCTTGGCTGCCAGGGCTGCGCTGCCAGGGAGACGAA  
CAGCGTAGGGCGTGGCTGGCGGGCTTGTGAAAGCTGGGCTGCAAGGTAGCAGCAGGGCGAGGGGGCGCCCTCCAG  
TGCTTCTGGAGCTGCTGCCGATGGCGCCGGCTGCTCTTCTGCCCTGGCCAGGGCCCCGGGTGCGCGCTCATGGAT  
GCCCTTGGCAGCCGGACCTGCGTGAAGGACGGCTGGCGTGTGCGCTGCCAGACCTGGCGGGAAATGGCCAGGGCTGGC  
CGAGCTCTGGGCTGGGATATCCCCGACAACCGGGCGAACATGGCTGCCCTGGGGAGACTCGACCTGGAGGTG  
TGGTCTGGCGGAGACAACCCAGTCAACCCAGGGCTGCTTCCGAGCAACTGGAGAGCTGGGTTGCTGGTGAAGCTTGGC  
GGCGATGGCGCAGGCCCTGCACTGGTGTGACAGTGGCTGCTTCCACCTCTGCCAGCGACATGGCCAGGGCTGG  
GACCGGCTACGAACTGACCCAGGGCTGCCGAACAGGGCGAGACGGCTGCCATCTGGCGTACGCCAGGGCTGG  
GAGAAGAGGGCAGCGCTGCCGGCAGTGGGAATGAAACAGTTGGCTGGTGAAGCGATCACTTGCATACCTTGATGAA  
CTGCTCAGTGAAGTTCGCTGCCGCAAGGTGTGCTGCTTCCCGCGCAAGCGCAGACCTGGCCGGCCGGCGAGCTCGACGA  
CGGTCTCTACCGCAGGGCTGGGAACAGCATGCGCAGGCCCTTCTCTGAGACCATGGCAAGGACCTGGAGGGCGCCGGC  
AAGCGATTGCCGCAACGACCGAAGGGCTGCAAGCAGGACCTGCACTGCCATGGCCGGCTCCCTGGCGGTGATCGTGC  
CGAACGCTGGTGTGATGTCAGGGCGGAGGAAGGGCTGCTGGAGTCGCCGCTGGTGAATGTTCCGGCTGGAGATTGG  
CGAGGTGCTGTTCATATGAGCAGGGCTGGAGTTGTGAGAAAGACGGGCTGA

Protein sequence: (SEQ ID NO: 141)

VKSASALEHDNKLLLKWTTLSQSQLSIGLICVVVLTVLLFS1CYWSLGRLFQEEEDKVSFHFTRMMDVIREHEVFLGRIAR  
KSDKTTQKYDYDVVPLQRHLLAKENGLAVYEGREFSFAMPFLLATKHALSDSSGDPFSLGVLLANFYGSFWSVSAYPAP  
QLLIFDLSGSTRLA VPSI PSTAQRDRLSGSYPMIVERILARLRTRPVGEDAQRVHWIRADRYRDSALEMLGVARVLDLPE  
LWWHDEPNHLIIAASLLLRRINDFQEOLVERPAFDTSYSLVSPDGEVLLGAAPATGLRDGLNLTRQGVAVQLSQPENGWL  
AVYRTDYGNNFRHSRWLVAGLLT PALLLAGWLGMRWYTSSVVNPVRAHQLVESDTSRSLTQTA PVALVLLTQDQQ  
LVTNCNHLAAQWLGGPTEI LGLTSNWKLF DARDQVPGD C1QVGGRLQTAFAATRYAGTEAVLCFVNFDITVHCEAETALS  
NAKRAADAAQSAKTFLFLARMSHEIRTPYGVGLTLEDDLTTLNERORAYLRTIQSSSATLQMQLISDVLDSKIEAGQMA  
LT LAAFNPDLVLR E VLG NFAASAMAKD LQFYACIDTEVPAQ LIGDVTRIRQV LNNLVN NALKFTD IGRVVL RVK LLS RND  
GRALLQWQVADTGIGIAHEQQERLFFAEFYQVSGAHAGGTGLGLS1CWHLAEMMGH LRMVSETGLGSSFSLVLELPED  
QSGLACRPGLLKSACVHVRSPVRELADSGAWLKANGCKVSSGEAAPSELETCVLLELLPMAAGPSSPWP GPRVRASMD  
APCQPELREDGWVRVGLHNLAGIGQALQALGGDIPEQT PANACARS GRLDL E VLAEDNPVNQALLREQLEELGCRVSLA  
GDGRQALQLF DSGRFDL LLSDVNM PNTG YELTQALR ERGETLPI1GVTANALREEGERCRAVG MNSWLVKPITLHTLHE  
LLSEFARAGVLLPAQARDLGP PAQLD DGLS P QVPERM RALFLETM GKDLEA RQAI RRNDPKGLQ QD LHRMAGS LAVMRA  
RTLVV M CQAA E EGLL SRECSA V EIGEV LVHIEQALE FV RKTG .

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
Applicants: Laurence Rahme et al.  
Filing Date: September 12, 2003 Serial No.: Not Yet Assigned  
Page 34 of 118 Customer No.: 21559

**FIGURE 18**

RL039

DNA sequence: (SEQ ID NO: 18)

```
ATGCGTCCGGGTCAATAGTTGGAATTAGAACACAAGAGAACGCTATGAGTAAGCTCAAGATAGTACTGGCCGATGACCA
TCCGATCGCGTATGGCGTATCGCACATGCTCGAGCGCGACGGTCGGTTCGAGGTGGTGGCGAGGCCTCCACGCCA
GCGAACGTGTCGAGCTGTGCGCGAGAGCGAGCCGATATCGCCTTACCGACTACAGCATGCCGGGAGCGCGCTAC
GGCGATGACTGAAACTGATCGACTACCTGCGCAACTTCTCGTACTAAGGTGCTCATCTTACCATGGTCGGCAA
CCGCCTGATCCTCGACAGCCTCTACGATCACGGGTGTCGGCGTGGTGTGAAGAGCGCGAAGTCTGACGAGCTGCTCT
TGGCGCTGACGTGGTAAGCAGAACCGCGTCAACCGGGCGCGAACATGCTGACCCGACAGTGTCTGGCGAACCGC
GACGAAGTGGAAAGCCGCTTCGGCGCTGATGAAGGAGTTGAGTACTCCGTCACTTCGTTCCGGCAGCAACGT
CTGCGATATCGCACGGCTGCTGAAACGTAAGCGTCAAGACCGTAAGCACCGAGAACGCTCGCGATGCCAACGCTGGAAG
TGAACAGCGACCAGCCCTGATGACCTCTGCGTGCATGCCAACTTGTTCCATTGA
```

Protein sequence: (SEQ ID NO: 142)

```
MRPGSIVGIRTKQEKPMISKLVLAADDHPIVRMGVCDMLERDGRFEVVGEASTPSLEVCRQSEPHIAITDYSMPGDERY
GDGLKLIDYLRLNFPRTKVLIFTMVGNRLLDSDLYDHGVSGVVLKSGELDELLALDVVKQNRVYRGANMLDPTSVLANR
DEVESRFARLSMKEFEVLRHFVSGSNVCDIARLLKRSVKTVSTQKVSAMRKLEVNSDQALMTFCVHANLFH.
```

## FIGURE 19

RL040

DNA sequence: (SEQ ID NO: 19)

GTGTCCAGTAAGATCCTGCTGCAAGGGGCACTGCTCGGCCCTAGCAATGCTGGCCGTGCTGGACGCCCGAGCCGGAGTCAC  
CGCCGAGCGCACTCGGGCAATAATCGCCGAGGGGCAACCGCGAGACGTCGCTGCTGGTCACCCAGAATGCCATATCCGG  
TCATAGTGAGACCTGGATCGACGATGGCGCCCGAACTCGACACCGCAGTCGCTGCCGCCGCCGATCATGCCCTACCG  
CCGGTGTTCGCCCTCGAACCCGGACAGCAACGCAGCCTGCCCTGCGGACCGGCCAGGGCTGCCAGGGACCGCGA  
ATCGCTGTAAGTGGTTGAACCTCTACGAAATCCCGCCGAAGCCACCGGGCTGCTGGCCGAAGGACAGTCACGGCTGACCG  
TTACACTGCGCACCCAGATGAAAGTCATCTACCGCCCTGCCCTGCGGCAAGGGTGCAGGAAGAAGCGCCACACCAGCTC  
AGGTTCCAGCGGGCGGGCGAACACTACAGATGGAGAACCCCTACTCCCTATTTCATCAGCCTCCCCGGCCGAGCTTGG  
CGGCCACACCCGCCCTGGCGGCCGAACCTGTTGCCCTCTCCAGGCGCTCTGCCCTCCGCCAGGCCTGCC  
GCGGCCAGGCCAGGTGCGCTTCAGCTGGATCGATGACGGCGCAATCTCAGCAGGGACGGAGCCTGCTTCACTGA

Protein sequence: (SEQ ID NO: 143)

VSSKILLQGALLGLAMLAVIDARAGVTAERTRAIIAEGHRETSLLLNVNQNAYPVIVQTVWDDGAPNSTPQSARAPIMPLP  
PVFRLEPGQQRSRLLLRTGQALPGDRESLYWLNLYEIPFPQATGLLAEGQSRITVTLRTQMKVIYRPRPLARGAEEAPHQL  
RFERRGETLQMNENPTPYFISLAGAELGGHTRLAAEELLPPFSRRVLALRQALPGQAEVRFSWIDDGGNLQQGRSLLH

FIGURE 20

RL041

DNA sequence: (SEQ ID NO: 20)

```
ATGAAAACATCCCTGCGCGTCTGCGCTCTGCTCTCGCGCTGCTAGCTGGCGACCTGCTACAAGGTAC
GGCGGTAGGCAACGCCACGACTACCTCCAACACCCAGATACTGCTCCCGTGAAGGCTCTGGCCGACCGCT
GCGATACCTGCAACGGTCCCTCGCTTACCGAGCGTGATCAACCGTCAAGCAGCCAGCTTCCAGCCCAGCGTAGCTT
ATCGCCAGCTCGGTGGCCGCTCAGCCAATCGCGACAGCCGGTACGACCCAGAGCGCTGTTCTCCGCTGTGC
TCCAGAGGACGATGTCAGAGATGTTCTCCACCAATGCGACGATCTCTACAGCGCTGGTACCTAGGAGGCACAGTG
CGGGCAACTCGATTGGCCTGCACTGGCCTATCGCACCGCCTGGCCAACGTGCTGCTGCGCTAACCCACGTGGAAACC
GGCGAGTATTCACCGATGTCGCGCGAGCCCTGCTCGCGGGCTGATATCGACTCGCGAGGCTTTCAACTGGTCAA
GGCGAACACCTCAGCGCGTACCGCCGAACGTGTCAGCGCCGCTGGAGTTCATCGCTACTACTCGCCGACTACCG
CCTCGCGGTTGACGCCATCACCCAGCCGCTGACATCGCCATCAAGGGTCCCGGCTGGCTAACCGTCGGC
GCCAGCCATAACGCAACTACCTCGCTGGCACTACAACCTGCGCCGCACTCGGCTGTACACGACGTGACGCTCAA
GCGCTATCCCACCTGTCGTAACCAACGTCACGCCCAACGTTGTTCCGCTGATTTCCTCAGTGAAGATTAAATGCC
GCGCGAACCGTGAAGATGCCCTTCGAGGTGGCCTTAAGTGCACAAACGGGAGTGATCAACAGCACCGCTCAGCGGTACT
GCACTGGGTATCAGGGCTTCAGCGGGGCGCAGGCCGEGTCCGCTGCACTGGCCTGAGGAACGCCATGGCGGGCTCTC
CTACCTAGTTCCGACCGTACGCCAGCCGCTATGGCCAAGGCGTGGTATCCGCTTGTGCGGACGGCAGTGC
TGAACCTGCTGGTAAGCGAGGATTCGCGATGGCAGCAATGCCAAACACGGGCTGGTATCCAGTGATCGGCAACGCC
TCGAACAAAGACTGGCAAGCGGGAGGCATCAGCAGTACAGCAGAACCTCCGCGCCCTGGAAAAAACTACCGTTGG
CAGCATGCCAGCGTTACCCGGGACGGGTGGAGGCCAGCGCAGGTAGTGATTCTGTCACTAA
```

Protein sequence: (SEQ ID NO: 144)

```
MKTSLRVLPLLLALLASSSWATCYKTAVGNAATTNTQIRPGEGSAGTWAGACDTNGSLGLPSVINVSDASFQPDGSL
IASSVAPLSQYQGDSAGYDPERVFFRCAPEDDVYEMFSTNADDLYSGWYLGGSAGNSIGLQSAYRTAWPNVLLRLTHVET
GQYFTDVWRERLLGGLDIDSRGFQLVKAKNLSAVRAELFRAPLEFIRYYSPTTASRLYAYTQPAGYIAIKGPGLAYPNV
ASHNANYLGWHYNWPGAIQLYNDVTLKRYPTCSVNTVTPHVVFPSISLSEINAGANREMPFEVAFKCQTGVINSTASSGT
ALGIRASAGAQAAALGLRNRNGLSYLVSdryQPGMAQGVGIRLLRDGSAMNLLVSEDSAMGSNAETRGWYFVIGNA
SNKTGEAGGIQYSETFRARLEKLTVGSMPSVTGPRVEASAQVWIRVQ
```

## FIGURE 21

RL042

DNA sequence: (SEQ ID NO: 21)

ATGTTCTGCCACGTTGAGGCACGGCACCAGGAAACTGCCGCTGGCTGGGCGCTAGCGCTGGCTTCGCGGGCT  
GGCCAATGGAGAGGCAGTATCGTTGACGACAGCCTGTTGATGGGCTGGGCTCGCCGGGACCCCTAGAACGCT  
TCAACCGGCCAACCAAGGGACCCGGAACTTACCATGTCGATGTCTATCTCAACGGCAGCTACGCCAGTCGCCACCAAGG  
ATCGACTTCGCCCGGGGGGGCGCTAACCCCTGCTCGGCAACGCTTCTGGCCGGACGCTGGGCGTCCGCC  
CGCCCTGAGGGCGCGTCAAGCCCTGGAGATTCTGGGGCTGGAAGAACGCTCGGCCACCTCAATCTCG  
ACACGGCCCTCTCGCCCTCGATCTCGGTGCCCCAGGCCCTGCTGGGATATCAAGGCCAGCGCTACGTTGGTCCGCC  
GAGTGGGACGCTGGCAGTAGCATGGGCTTCGCAACTACGAGGCCAGCTTCTATCGCTCGAGCTCGACGGAGTAGCGG  
CAACGGCAGCTCGACTATGGTACCTGGGGCTGAGCGGGGACATCAATTTCGCCCTGTTGGGCCCTGCCACCACTGCA  
ACTACAGCTACTCCAGTATGCCGAAACACCCGAGCGACTGGAACAGCATCCGACCTATGCCAGCGCGCGTGC  
GGCCCTGCCAGCGAACGCTGGGAGAGCCTCACCGAGGGCAATCTGTTGGCAGCTGGGTTATCGGGCTGCG  
CCTGGCCAGCGAGGCCATGCTGGCAGACTCGCAACCGCCCTATGCTCCACAGGTACCGCGTACAGCAGAACAG  
CACGGGTGGTCACTAGCCAGAACGGCAAGAGGTCCACCGAACCTCCGGCTCGTCCCGTCCCTCGTCAACGACCTC  
TATGGCACCGCTTACCGCGCATCTGGATCTGCAACTAGTGTAGGGCCAGCGCAGCGTCTCGCGTCTTCCGTG  
-TTCGGCGGTTCCCGAATCCATGCCCGGGCATCTCGCGTACAGCGCACCCCTGCCAACAGCGCGCAGTAGTGGCAGC  
GCAACGACCTGTCGGCGACTTCACTTACCGCGGCCCTGACCAACTCGCTAACCGCAACCTCGCTCGCGCTGGC  
GAGGACTATCTGGCGCTGCTCGCGAGGCGTCTGCCACGCCCTACGGAGCCTTCGCTTCAACAGCATTTTCCA  
TGCCACGGTGGAACGCCAGGCCAGCGCAAGCAGGGCTGGCTGCTGCTGACTACAGCGGACCTTCAGCCGACCCAGA  
CCACTCTCACCGCTGGCTTACCGCTATTCCACCGAGGGCTATCGCGACCTCGCGACGCCGCTTCCGGCGCCACGCC  
GATGAGCACAAACGACTCTGGAACTCCGACAGCTACAAGAACCGTACCCCTGTTCAACCGGGCTGGG  
GGGACTCGGCAACCTGATCTGCGAGGCCACAGCGACTACTACGAGCCAGAACGCCGACACCCAGTTGCACTGG  
GCTACAGCAACACTTGGCGCAGCTCAGCTAACACTCGCCATTGCGCCAGCAGACCCACTGGTACCGCGATCTGAC  
GACGACTACGACCCGTCACTGCCGCCAATACACCTGCGGACCGCAGCGAACCTGAGCAACACCTTAACCG  
TTCCATGCCGCTGGGCTCTCCAGGCCAGGCCGAATCTCAGCGGATGGCTCCCGCTTCCGGACAGCCGCGGCA  
GCAGCTACAGACGGGCTCAACCGGACCCCTGCAAGAACGCGCAGCTGAGCTACCCGATTGCGCCGGGCGCG  
GACAACACCGGCCAGGATTTCAACAGGCCAGCTGCGAGAACACAGACTCTGGGGCAGCCTGAACGCCGCTATGCCGAGA  
CAGCAGCTACCGGCCAGCTCAACACCGGCCCTGCCGCCGGCGCCCTGATCCTGCCGCCCTGACCTCGCCCTACG  
TCGGCGACACTTCCGCTGGCTGAGGCCAGGGGCCAGCGAGCTGCCGATCGCGTGGTCAAGGGCGCGCGTCAAC  
GGCAATGGCTACGCCGGTGGCTCATCACTCTGCCCTACCGCTACAACCGGTCAGCTCGATCCGACGGG  
AGAGGCCGAGCTGGAGACCCGAGCGCAAGATCGGCCATACGCCGCCGCCGCTGATGTGAAGTCCGACACTGA  
CCGGCTACCCATTGCTAACTGCCGCCAACCTGCCGAGCCAGCGCTACCGCTAGGGCAATGTGCTCGACAGCCAG  
GGTGTGAACATGCCATGGTCTGCAAGGCCAGGTCTATGCCGCCGCCAGGGGACAAGGGCCCTGCGCGTCA  
ATGGAGCAACGCCAGGGGCCGCTGCTGGATTACGCCCTGACATGCCCTGCCAGGCTATCGAACCCG  
AGCGCGTGTATGCCCTGAGGGCACCTGCACTGCCGCTCTGGAGGCACCATGA

Protein sequence: (SEQ ID NO: 145)

MFCHV EARRT GKLPL ALGG LALA FAGL ANGEA QYRF DSSLL MGS GLAGGT LER FN RAN QVDP GTYH DVY LNS YAS RTR  
IEF PRAGGV KPCFG EFLR RTL GVR PASE AGV QAPG DCLG LEER LPG STF NLD TALL RLD LSV PQ ALLD I KPRG YV GPD  
EWDAGSSMGFV NYDAS F YR SSFDG VGG NGD SDY GYL GLS GG IN FGL WRL RHQS NYS SYSS YAGN TRS DWNS I RTY AQR A VP  
GLR SEL TLGE SFT EGNL FGSL GYRG VRLA S DDRMLA DS QRRY A P QVR GT A NSN ARV VI S QNG KK VHE SAV A PGPF VINDL  
YGT AYDG DLDV QVIEADGS VRSF SVPS A VPE SMRP RGI SRY S ATLG QAR QYGD NDL FGDFTY QRG LTN SLT ANLG SRLA  
EDYLA LLGGV L APTG YGAF G FNS I FSHAT VEN GQR KQG WRV GLN YS RTF QP T QTT LLAGY RY STEG YR D LGD A L S ARH A  
DEHND SWN SSY KQRN QFT LLVN QLGGY GNLY LS GAT SDY DKG SRS DT QLQ FG YS SNT WRL QSYN LAY S RQ QT T WY RDLN  
DDY DPSL P QY NL RGHS ERS NT LTL T LMSPL GSS QP NL S AMAS RRS GDS R GSS Y QT GLN GT LDE DRSL S Y AIA GRD S  
DNHGS DFNG SLS QK QTS VTA L NAGYAE NSY RQL NT LGR AAVL H RGG L T L G P V Y GDT FA LVE KAG SAG V RGG QG ARVN  
GNG YAVV PSL S P YRN P VSL D P QGM GEE A S L ETER KIA P YAGA A VHV K FRT L TGH P L I Q A Q LAD GS AL P LGAN V NL DS Q  
GV NI GMV QGG QV Y ARA EGD KG R L R V W S E R P G D A C L L D Y D L D T G P R O A I E P G O A V R L O G T C P V S E A P

FIGURE 22

RL043

DNA sequence: (SEQ ID NO: 22)

```
ATGAATACTTTCCACTGCCTCCGCTCCGTGCGGCTACGCTGGCGCTGCCCTGCTGATAACCGCCATCCGGCTAAAG
CAGCGTGGTGTATCATCGGTACTCGCGTGTATTTATCCGGCGACGCCGGAAAAGACCGTGAGATGATCAATCAGGACG
CATTCCCCAACGTGATCCAAGCGTGGATCGACAACGACGACCCCTCTCCACCCGGAGACTGCAAACGGCCCTTCTG
GTCAGCCCAGCGGTACCGCATAGCCCCGGAGCGCCAGACCCCTGCGCCTCTGTATACCGGGCTCCGCTGCCCGA
GGATCCGAATCGTTGTTCATCTCAATGTGCTGAGATCCCGCCCGCAGCTGGCAAAGCCGAGGCCAACCCAGATGC
TGCTGATGCGAGCGCAGTCGACTGAAGCTGTTCTATCGCCCCGCCGCGCTGCTTGGGGCTCGGAGCAGCTAGTCGAGCAG
TTGCACTTCAGCCTGGTGCAGCGAGCGGAACTGGCGTGTGCGGGTGGACAACCCCAGCGGCTACTACGCCCTTCG
CGCGCGATGCTGAGCATGGCGAACGTCGCTGGGGCTGCTGAGCATGGTCCGCCAAAGGCCAGGGCAGGTGG
CGCGCGAACGCCCTCGCCGCTGCCCGAGGACGGTCCAGTTGAACGCCCTCTGATCAATGACTACGGCGCGAATG
GAGGTCCAGCATGTTCTGCCACGTTGA
```

Protein sequence: (SEQ ID NO: 146)

```
MNTFPPLPLRAATLALLIPAIPAQSSVVIIGTRVIYPGDAREKTVQMINQDAFPNVIQAWIDNDPSSTPETANAPFL
VSPAVTRIAPGSGQTIRLLYTGLPLPEDRESLFHLNVLQIPPRDLAKAERNQMLMQRSLKLFYRPAALLGGSEQLVEQ
LHFSLVQASGNWRVRVDNPSPGYASFAGAMLSIGERRWRLSSMVPPKGQAEWAAERPSPLAPGPVQLNALLINDYGARM
EVQHVLP.
```

FIGURE 23

RL044

DNA sequence: (SEQ ID NO: 23)

ATGAAACCTCAAAGTACTGCCCTGACTATGCCGCATTCTGCATTGCCGGTATGCCGGCTGCCAATACCATCAC  
CTTCCACGGAGAAGTGACCGACCGACCTGTTCCGGCTCGTGCAGGACGAACCGACCCGACCGTGTACTCGACACCG  
TACCGGTAAAGCGCTCTTGACGGCGAGTCGGCAAACCCGCCGGGAAACCGCTTCAACCTGCAACTGACCGTTGCGCC  
GCTCCGGCGCCGATGCCGAGGAGCACTTCAGCGTGATGTTCAAGGCGTCAATCGACCGACCGCCGGCAATCTGACCAA  
TACCGCGTCCGCCGGCCACCGGGTAGCGCTGCAGCTACTGACGGCACCGGGCGCAGCGAGGTCAATCTGCCGGCG  
GGTCGGCCGTGGCTGCCGTGACATCGTGTCCAGGAGGGCAGACCCAGCTACGACTATGCCGTCCGCTACATC  
TCCGAAGCGACCACCGTCACTCCGGACCGGTGCTCGGCTCGGTGACCTACACCCCTGCGTTACGAGTAA

Protein sequence: (SEQ ID NO: 147)

MKPQSTALTIAAFLALPGIAAAANTITFHGEVTDQTCASAVDGRDPTVILDTPVPSALDGAVGKPAGESTFTLQLTGCA  
APAAADAEHHFSVMFQAVNPTSAGNLNTASAGATGVALQLLTAPGGSEVNLAGGSAVAAGDIVLAGGETTSYDYAVRYI  
SEATTVTGPVVLGSVTYTLRYE

FIGURE 24

RL045

DNA sequence: (SEQ ID NO: 24)

AGTCCGCACGGTAGTGACGACTGGAAAGCGCTTCTGTGCTGCCAACAAACCTGGAGCCCAGCATGAGCCGGCGGGCAATTG  
TTGGGATATGCCGTGGCGGAATCCTTCAGTAGTTGAAAGAGCGTATCCGAAACGCATCTACAAAACCCGAGA  
CATGGCCCGGGCGGATGTTTGACTACATCGAGGTCTTCTACACCCGAACCCGGCGCACAGTCATCTGGGTGGCGTC  
GTCCCAGGCCCTTGAAAGCGCCTCG

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
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FIGURE 25

RL046

DNA sequence: (SEQ ID NO: 25)

```
ATGGCTGAAGTCACTCAACGAGCAGAGCAGCAACAAGAGAGCCAGAAGACCCCTCTGGCACCATCATCAGTACGCCCTT
CCAATTCTCGCGTGATGTTGGGTCGATCGCGCAATCATCGTGGAGTGGGTTGCTGTATTTCTCTGGCCTG
ACCGGGCTGGAAAGCATGCCAGGCCATGTTGACTACGAACCTCAGTTGGCTGTCGCAAGGGCTGCTACACAGCGTCGTC
GTGCAGGAGGCCAGGTGAAACGCCACCTGGCTGGCCAGTTGGCCTATGACTGGTTGTCGAAAGACCGGGATGGTCGA
CTGGATGACCAACATGACTACCATCGCGCAGGCCGGGACCGAGCCCGCTGGACGTTGCTGCTATCTCACCGCCAGGGTG
TCTCCACCGCTGAGAACTACGCCCTGGCCGCTGTACACGGTGTGACATTGTCGCGCCTGGTGTACCTGGTCATG
ACGATCCGTTATTGCTGATGGCCGCTACCCGGCTGGTGGACGGCCTGGTGCACGGGGACCTGCGCAAGTTCGGCGC
CGGCCGGAGTCCAGCTACCTTACCAAGGCCGCCAGCATTCCTGGTGGACGGCTTGGACGGCTTACCC
TGGCAATTCCCATCAACATCAATCCCCGCTCATCCTGTTGCCCTGCGCCACTGCTCGCGTACCGGTGTGCATCACA
GCATCCACCTTCAAAAGTACCTATAG
```

Protein sequence: (SEQ ID NO: 148)

```
MAEVHQRAEQQQESQKTLGGTIISTPFQFLGVMFGLSLIGAIIVEWVCLYFFWPDAGWKHAQAMFEYELSWLSQGLLHSVV
VQEPRATATWLAQLAYDWLFVKTGMVDWMTNTTIAQAGPRSELDVRYLTAQGVSTLQNYGLAALYTVLTFVVRLLVILVM
TIPLFVMAFTGLVDGLVRRDLRKFGAGRESSYLYHKARGSIIPLA VVPWTLYLAIPININPLLILLPCAALLGVAVCIT
ASTPKKYL.
```

FIGURE 26

RL047

DNA sequence: (SEQ ID NO: 26)

ATGGCTGGCCAGTACCCGTTGGAAGCGCTTGGCGGCTGCGCTGGAGCTCTACACCACCGTGTGCTTCACCGCAGC  
CGCGCTCTGCATCGTCGCCCGTGGACGTTCTCCCTACTCCGCTGTTCGCATCGTGGCCCGCTGTGCTTCGCCCTGGC  
TGGGTATCGTGCAGCTGAAGCAGGGCCGGTGGTGTCCCGTACCGCGGAACATTGCCGACTGCCGAAGTACACGATG  
ACCAGCGCCGAGATGCCGTAGCAACGAACACTGTTATCGTAAAGGATTCGCTGGACGCAGAAGCATACGAGCG  
CCTGGCAGATACCTACCTGCCCGTGGACGTTCTACGTCAGGCCCTGCCCTACTACGAGCGCGCGCCGCGTTGGAGA  
AGCAGCTCGAGTTGCCCGCTTCCCGTGAAGCTGGTGCAGGCCAAAGCCACTGCGCTGGGACGTTGGCTGGAACCCCGCAGCG  
CCGCTGCCGCCGTGGCGGTTGGCTCGCATGGCATCGAGCCGCGAACAGGACGTTAGGCTGCAACTGGCGA  
GCCGCTGCCAACACACTGGTACTCGCCACCCGGGTGGTAAAGACGCCCTGCCGAGCTGTTATCACCCAGGATA  
TTCCGCCACTCACTGCGGGTACCGACGCCGGTGAAGATGGGCCGGGACCCAGACGGTTACCCACCGCTATCGG  
CGCCGGCGCGAGAGGAGCAGCCGACTACGAGGTTGGTATCGTCTTCGACCCGAAAGGCGACGCTGACCTGCTGAAGCG  
TATGTACGTGGAATGCGAACGTGCGCCGCGCTGGAGTTACCGAGGTTACGTTGACCTCGTCACTCGTACCTGACCTGCGGAC  
GCTACAACGCCGCGCCGGTTCGGTGGAGTCTCCGAGGTCGCCACCGCCGCGCTGCCGCCAGCTCTCCGGGAGGGCAAC  
AGCCGGCGTTCGGCAGTTCGGCTGGCTCAACATCATCGCCGCCGCGCTGCCACGCCGCTGGTATCCGGCCTGA  
CTACAGCAGATCTCCGGCACGTCGTGAACATCGATCGTGGTCTCGAATATGCGAGAAATACATCAGCGAGCAG  
ATCCCAAGGGCTGGGACCCATCATCAGATCGAGGCAAGCTCAACGACAAGAAACATCCGTTCAACATGAAAGGACGG  
CCCTGCCGGTGTAGCCATGACCAGTACCTGACACAGAAACGACATGCCGACCCGGTATGGAAGGTTGAAGAGCGC  
CGTGCCTACGACAAGACCTACTCGACAAGATCGTGGCCTCGTGTGCGCTACTGGAGAAACTCACTACCGGGCGGA  
TCTCGGAGCTTTCGCCCCACTACCGGACCTCAACGATCCGGCCGATCTCGACTGATGAGCAGGTCTATCCGCAA  
CGCGCCGGTCTACGTCGGCCTCGACGCACTATCGGATACCGAGGTCGCCGGTGGCAACTCCATGTTAGCGA  
CCTGGTCTCGGTAGGGTACATCAACAGATGCGTGTGATGCGGCTGCCGGTCTCGCCAGCGGCAAGGTCC  
GCACTCAACCTGCATGCCGACGAGTTCAACGAGGCTATTGGCAGCAGGTTATCCTGCAAAAGCGGGCGGCC  
GGCGTGCAGGTGACGCCATACCCAGACCATGAGCAGCATCGAGGCCAGATCGGCTCCCGCGCAAGGGCGTCA  
CATCGGCAACTCAACAACTGTTATCGTGCAGGTGCGAGACCGCCACGCCGAACCTTACCAATCAGCTCCCA  
AGGTCCAGATCTACACCAAGCACGCCGGGCAACCGACGCGATCAACAAACAAGAAGGTAGCCTTACCTCC  
AGCTCGCACGACCAGGTCGAGATGACCAGCGTGGCGATGCTCGAGGCCCAACATCATTGGTCTGCCCAAAGGACAAGC  
GTTCGGCTACTCGAGGGCGGCAATCTGGAAGATCGCAATGCGCTGCCGGTCCCGGCCAGGAGGTGATGCCGA  
AAAGCTGCAGGAGCTGGCTGCCGGTATGCGCAAGGCCAGGCCAACAGCGAGTGGGAGGCCGGGAACTCC  
GCCCTGCAGGATGGCTGCCGCCAGGACCTGGTCACTACCTCGGCACCGGTGAGGATGCCGCTGA  
ALQDGLPQDLVDDFRHLGTGEDAA

Protein sequence: (SEQ ID NO: 149)

MAQQYPLEALLRPAVELTTTVCFTAALCIVAPWTFSLTPLEFGIVAALCFAWLGIVRLKQAGVVLRYRRNIRRLPKYTM  
TSAEMPSNEHLFIGKGFRWTQKHTQRLADTYLPQFASYVEPSPLYERARRLEKQLEFAPFPLKLVAKATAWDVAWNPAR  
PLPPVGLPRLHGIPEPREQDVGLQLGERVGHTLVLGTTTRVGKTRLAELFITQDIRRTHCRVRRRRVKMGRRTQTVHHGYR  
RRRAEEQPDYEVVIVFDPKGADDLKRMYVECEERAGRLDEFYVFLGHGPDLRSARYNAVGRFGRISEVATRVAGQLSGEGN  
SAAFRFAWRFVNIIJARALHALGIRPDYQQILRHVNIDALFVEYAQKYISEHDPRAWDTI IQIEGKLNDKNIPFNMKGR  
PLRVVAAIDQYLTQKRIADPVMGLKSAVRYDKTYFDKIVASLLPYLEKLTTRGRISSELLSPNYADLNDPRP1FDWMQVIRK  
RAVYVGLDALSDTEVAAAAGNSMFSDLVSVAGHITYKHGVDDGLPGSLASGKVRINLHADFEFNLIGDEFIPMVNKAGGA  
GVQVTAYTQMSDIEAKIGSRAKAGQIIGNFNNLFMLRVRETATAELLTNQLPKVQIYTSTPASGANDAINNNKKVAFTS  
SSHQVQMTSPVLEPAHIIGLPKGQAFALLEGGNLWKRIMPPLAVAPDEVMPKSLQELAAGMRKGQAANSEWWAEPGYS  
ALQDGLPQDLVDDFRHLGTGEDAA

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
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FIGURE 27

RL048

DNA sequence: (SEQ ID NO: 27)

ATGACTACTCATCTGATCACCTAGTCATCAAGCAGCCGAGCGACGCTCAGGCACGCCAACTCATGTACCAGGAGTTGCT  
CGGACTGATCTCACGCTACGGCGGTGAGGTGACGTCCAAGGCCTTGAGGACAGTCGACCCCTCTGCGAGCTGCTGGTGCG  
AGATGCTGCCTGATCATGAGGTAGAGCAAGGCCAGGAAACAGGTGCTCGAACCTCATGCCAAGGGCCGCTGCAGGCGCCG  
GCAAGCCTGAAGGTGTAA

Protein sequence: (SEQ ID NO: 150)

MTTHLITLVIKQPSDAQARQLMYQELLGLISRYGGEVTSKALEDESTLCELLVQMLPDHEVEQARKQVLELHAKGRLQAP  
ASLKV

FIGURE 28

RL049

DNA sequence: (SEQ ID NO: 28)

```
ATGAAGAAGTTCCCTGCCACGCTGGCATTGACGGCGTTCGCGACTCAAGCCTGGCCGCCGGCTGATCGTTGTCGA  
AGACCTCGCGCGCCCTCGCGCTCCCTACTACCAGGGCCTGGATCCGCAGCCATCCGCTTCGGCACCAAGGACCTGGCG  
ACCTGGCGTCCGTGGCTCAGGTGCCTTCAGTTCGCTCCGGCCGCTATCGCCAGGACGGTCCAGGGCGCGCCATC  
AACGCTCAGGCCTGCAACTGCTGTTCTGGTCGGCGACGACAGCTGTCGAACCTGGCTGAAAGAGCGAGGCACGA  
GCTTCGAGACCTCCAAGCCGTGGCCCTGGCAGTGAACGTGGCCAGCGAAGCCGCTGACGGAAATCCGGGCTGGGGA  
AAGGACTTCAGATATTGCCGGCGCCGGCGACGACCTGGTCGACCGCTAGGGCTGCAGCATTACCCGCCCTCATCACA  
TCCACCGCCATCCAGCAGTAG
```

Protein sequence: (SEQ ID NO: 151)

```
MKKFLATLAFCTAFATQAWAAGLIVVEDLGGASALPYQGLDPOPSASAPGPGLGVRGSGAFPVRSARLSPGRVQGRAI  
NAPGLQLLFLVGDDTLSRTWLKERGDELRDLQAVGLAVNVASEARLTERAWGKGLQILPAPADDLVDRLGLQHYPALIT  
STAIQQ.
```

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
Applicants: Laurence Rahme et al.  
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FIGURE 29

RL050

DNA sequence (SEQ ID NO: 29)

```
ATGGCAACGTCTGTAGTCGAGCCCTCCAGTTGCCACCCCTGCTGGTCTGGTCAACATCGCTCAGGCCGCCGTGGATCC
ACCGCCGGCGTACAAGCAAATCGCCCTGCCAAAGGGGTTCCGGCGAGGTGCTACTCGGTGCGCTGACCGAGAGCA
AGGTCTGCTGCCGCCGCGAATACGTTCCCTGGCCCTGGACATTGAACGTCGCCGGAAATCTTACTACTACCGCAGCCGC
ACCGCCGCCCTGCACAGCGCTACTCGCGCGATCAACCTCTACGGGGCAAGAGCGTCGATTCCGGCCTGGCCAGGTCAA
CATCGCTGGAACGGACATCGTTCTCCAGCCCTGGAGTCCCTGGATCCCTACAAGAACCTGGACGCCACCTCCGACA
TCCTGATCGAGCAGCGGGACGCCCTGTATGCATCCGCCCGGAAAGACCGGTGGACTGGATCCAAGTTGCCGGCCGTAC
CACCGCCCCGCCGCCGGCGCGCCTGCCGCAAATACCGTAGGACGGTTCCGCCACCTTAGCCAAGTTCTGGCGTCAA
CCTACTGGTGACCAATCCATGA
```

Protein sequence (SEQ ID NO: 152)

```
MATSVVRALQLATLLVLVNIAQAAVDPPPAYKQIALPKGVPAEVLYSVALTESKVLLRGEYVPWPWTLNVAGKSYYYATR
TAACTALLAANILYGAKSVDSGLGQVNIGWNNGHRFSSPCESLDPYKNLDATSDILIEQRDALYASAPGRPVDWIqvAGRY
HRPAGGAPAAKYRRTVSRHLSQVLGVNLLVTNP
```

### FIGURE 30A

RL051

DNA sequence: (SEQ ID NO: 30)

```
ATGATCAGAACCGTATCGCTCTGCCGGCTGATGCTGCTGAGCTATCCCGCAGCCGCCAGGAGGCCGGCAAG  
CCGAGAGGCCAGCAGCCAACCTGTCGGTAGCCAACCTCGCACGCTGAGAACACAGACATCTCAGAGCACCTGGCCAGG  
AGTGGGACTGAACCAACAGGAATGGACCGCTACCGACGCTCATGCAAGGCCCGGGCGCTTACTCGCCTGGTATT  
GATCCGCTGACCGCCTGGCATCGAGGCCGATCGGAGAGGAACGGCGGGTATGCCATCTACAGGTCCAGGCCA  
ACGGCGCCGGGTCGAGAAGGAACCTGCCATCCAGCGCCTACAGCGCCTACAGAACGCCCTCGCCGCCCTATCCAGGCAGGGGG  
TGATCCGCTCACCGAAAGCAGCACAGCCAACCCGTCGGCACGCCAACATGAGCCAGCGTTGCAGAGCAGCGGCC  
CTGGCCCTGTTGTCAGGACAACCTGCACCGCCTGCATCCAGGGTCCGCCACCTGCAACATGAGAAAAGGAGTTGA  
CCTCTACTTCGTCGGTAGCCAGAACGACGAGCGACTGCGGCCTGGCAATCTGCCGGCATCGACCCGAAGAAGG  
TTCGAGCAAGCAGATCACCTCAATCATGACGAGGGCGCTGGATGCCCTAGGACTGGCGAGGCCCTCCGCCCTG  
GTACAGGAGGTGAACGGCGATGCCAACGCTGTAG
```

Protein sequence: (SEQ ID NO: 153)

```
MIRTVSLLSGLMLLSYPAAGQEAASREASSQLSQLGTLKQQTQSQDLAQEWGLNQQEWTRYQTLMOGPRGAYSPGI  
DPLTALGIEARSAAEERRRYADLQVQAERRVEKELAYQRAYDEAFARAYPGEVIRLTESTANPSGTPNMSPALQSSGR  
LALFVQDNATACIQRVRDLQHAEKEFDLYFVGSQNDAAERVRRWAILAGIDPKKVRSKQITLNHDEGRWMALGLGGALPAL  
VQEVNGRWQRL.
```

RL052

DNA sequence: (SEQ ID NO: 31)

```
ATGAAACGCCATCCCTGCATCAATGATTCTGGCTCTGTTGACGGCAATGGCCGCTGCTGAGCTACCAGCAGTA  
CCAACCTGTTGAGCTCCGATCAGCGCTGGACAGTCGGCGGAAAAGGCCCTCGCTGGAGGCCATCTGGCTCGCTTGAGTC  
GAGTCGAGCGAGCGCTCGACGCCGTTGGATGGACAGCACCTGGTCAACGAGGACTTCCGTTAGGCCAGCAGGCCGCTG  
TCCAACCGAATTGACCGCTGCCAGGGCTTCGCAAGCAGGCCCTCGATGCCGAGAACCTGGCTCAAGACCCAGGCC  
GGCGGGCACCTCTGGTGTCTCAAGGAAACCGTGGAGACACTGGACGTTCTGTCAGCGCTTCAGAAGAAAAGCAGGCC  
AGGCAGCCGGCTGATCGCCAGGCCAAAAGCCCAATACCGCCAAGGCCAAACCCAAACCGATGGAGCCC  
CCGCCCTCTCGATCCCTGGCTGGAGATCGGGGGAGAACGGTTCTGCGTTGCACCTCCGGATCCACCCAGCT  
CAGCCAGATCTACCTCATCGCCGGAGATGCCGTCGCCAGCACCTGGCAGTACCGACCTTGACGATGGTACCG  
CGCACTTCGACGTCGCCGGCACCTGCCAGCGTTGCATCCAACCATAG
```

Protein sequence: (SEQ ID NO: 154)

```
MKRSPSPASMLGLCLTAMAGLSSYQQYQLVQLRSVDSAAEKASLEAILARLSVDERLDAVDGQHLVSNEDFRSGQQAL  
SNRIDAAQAFAKQASDAVENLAQTTASAGDLLVLKATVETLDGSVRTLQEKOAKAPPLIVPAKRPIPAKPKPKPMEP  
PPFSILGVEYRGERFLSVAPPGSTQLSQIYLIIRRDAVAGTTWRLTDLDDGTAHFDVAGTSRSVRIQP.
```

RL053

DNA sequence: (SEQ ID NO: 32)

```
ATGCCGCCGCTTGATCCTCTCGTCACGGAGGGATATCCTATGTCACGCCGTAAGCGAACCTCACTGAC  
TACTCCACCTCAACGAGTCCGCCCCATCGCATCCGCCAGCGACGCCGATGCCAACACTGGTTCTGGTTTCGGTCAG  
GTCAGCCTGCTGCTATCCAGCGTTAGCCGACGAAGGCCAG
```

RL054

DNA sequence: (SEQ ID NO: 33)

```
ATGGCGAAGCTATCAGAAAGGATGCAATGATGACAAAACCTACTTTGATCTCTGAACCTGCCCTGCCAGGGCTCATTC  
GTCGATACAAAAGCTTATCTGTCAGGCAATCTCCACAACCTGCCAACACTGGAGTTCTGGAAACCGTATACG  
CCTATGCTACGATCAAATGCAATTAGTATCGTCACGCTAGATCCTGCAATTCCACCCAGGCTAACGAGTGCATA  
TCCAAACCTGGCAGGTGCCGATTGCGTAGGCAACGACATTACAAAAAAATTACATGAAACCAACACTGGAGAACACCTGTTGA  
GATGGGGCTCGTCTAAATAGCATCACCTTGGAGGATATCAGGCCACCTAAATCAGCAAGCCATCAAATCGTTCAAG  
ATATGCAAGGATGGAGACAAGGTGAGAAGGGCCCTCAGGCCAAATATGCACTGGTTCTGTTATGGACAGGGAGATAAAT  
ACTGATTTCATCGCTGTAATGAACTCGCTGCCAGAGAGCGAAAACCGTCAATAGTTAGGGGCATATCACCAT  
CGGGTACGGCTTCGATACCTTCGTCATGAAAGCGTCCGAGCTAACCTTTGATCTTGTGGTTCTACCGCAGAGAAGG  
TATTACCTGCAATTGCGAGCTATCAACGCTGCCAGCCAGGCTTCTGGAGCGTCTAGCCTGCTGGACAAAGTCTACGGAT  
GACGATGGGCTTACTCTTGTGCTCAACGCTAGCAAGCAACCGAGTTGCAAGGAGATAAAT  
GAATGGGCTACCCCAAGCTATCAAACAGGTTGCGCTTGTATCTATATTATCAATATGGGAGACTGGTAATTTCAAAAT  
TTCAACAAGCTATAAATAGCCATGATTGGCCGGAGTCATCATGAACTTGAACAACTGGAAATGGTGTACCGAATGATCCT  
CTCCAGTCATTACAAACGATTGAGAGCGAGCCAAGTATCGGCAATATCCTCAACTATGAGCAATG
```

Protein sequence: (SEQ ID NO: 155)

```
MAEAIRKDAMMTKLYFDLLNSPAEAHSSIQKSLSVQAIISTVPILEFPSETVYAYASYINALSIGQRIDPAFTQSLTSI  
SNLAGRPPIAVSDIYQKIHETTLRTPVEMGVRPNSITFEYQATINQQAINMVQDMQDGDKGEKVEALQANMQFLYQGEIN  
TDFIARNELAAGQRAKTVAIQGHITIGYGFDTFVHEASELNSLNLVGSTRQKVLPAQLQSTS DPGFWSYALLGQSLTD  
DDGLLLFSAKARAVVQRIASNQFAGKWNGLPPAIKTVVALDLYYYQYQGTGNFPKFQQAINSHDWPAPIHELRNWNGVPNDP  
LQFITKRLEERAKYLAISFNYEQ.
```

**FIGURE 30B**

RL055

DNA sequence: (SEQ ID NO: 34)

ATGAACACACAGTGAGCAGAACAGATCAATATTTACCAAAATCCGGGGCAGTCTATTTCCGGTCTCTACAAGGG  
GCTGGCTAACCAAGCTCTCCGGGAGGCCATTCCAGAGGTACAGCTGTGGAGGCTTGGGATATCCCTCTCGTACTCC  
ATCCGGAGTTGTGCTAACGGAGATGTCGAAAGATCGATAAGGAGTACGGAAACGATCCTGCTGAGTCAGCTCAG  
GTTATCTGCTTCAACTCAAATGGCTCAAGAACAGGCTAACGGCGGGAGGTTACAGCCTTGATCAGTTCTGTCTC  
CTCCAATCTCAATACCATTAAGAGTCTCATGGTCTAAATTCTAAACCTGCTGAAACAATCACCAGAACGATACCCGA  
CTAGCGTGGAGTTGAGATCTGCTAGGTGGCAGCTCGGAACCCAGGATTCTGGAATCGAGGCTCTTACGGTGCAGTCTC  
GCCGCTCTAACATCAACAACTTCAGGCATGAATCTGCCAGTCTCAACACAGTCTCACTCAGGGAATCGGTGT  
GAAGCTTCTCAGGCTGAATATTGGCTGCTTACAACACATAGCCACTGGTATTGTTACAACCGGAGTGGCGATAA  
CGTGGCCTATTGGGCCACGGTTAG

Protein sequence: (SEQ ID NO: 156)

MNNTVSETQQINIQYQNPQSIISGLYKGLANQCSGPQFPEVQLVEAWDIPLVLHPEFVPGDVSKIDKEYGTILAAESAQ  
VILLQLQMAQDKAKACGEVTALISSLVSNLNTIKSRHGANYLNLKQSPNRYPTSVGEIMSGSPNQDSGIEVSYGASL  
GRLTSQLQAMNLPAISLQLLTQGIVKLSQPEYWPAYNNIATGIRYTTGVAITLAYWATV

RL056

DNA sequence: (SEQ ID NO: 35)

ATGACCCAAGCTGCGAAAATACCAAGCAAATGAGTACTCATTGGGGATGGAAGAGGGTACATCAATATCTGGCCGAAAAA  
GGATGAGGCTCAGGCATTCTTATCCATAATGATGGGCTAATGGGCTACATGCAGCCTTAAAGGACTCTTAGAGATA  
ATAAAGGAGTGGTGCATTCCGCGTATTCTCTGCTTATGTTGCTAAGTATACCCAGACAGGGCTGCTGTCAGTAAGC  
GTCAAACGTCAGGAAAATTCGCCAACGCTGCTGCTGATGGTCCGCTTAGAGTTGGTGTGAGGAGCCTATAGCGTCCC  
GCCCAAGGGCTGCTACTATATGCAAAATAAGGAAAAAAACTCGACAAATGTTGGTGTGAGGAGCCTATAGCGTCCC  
CCGCTCGCCCTTATCAAATAAGCTTGTGCTAGCGCAACCGAGCTAGCTATCTGCCAAGATATACTTGACGAAC  
ACACTTGCCATGATCAGTGTGAAAGGGAGAGAATGCTCGTGTGAGGATATGCCCATGGGTGCAAAGCAAATTCC  
TGTAAAGAGATGACGCCAACGGCTGAAGACTGCTCCCGGGAGCACCGCTTCGCTATGGAACAACCGGCCAGGCTG  
ATGCTCTGCTGAGCGATGCAGCGACGAGAAATAA

Protein sequence: (SEQ ID NO: 157)

MTOAAKIPANEYSLGDRGYINIWEKDEAQAFILIHNDGPNGATCSLKGTLRDNKGVVHSPYSSASCLLSITQTGLLSVS  
VKREENSPSCSAWCGRPRWFEGAYSVPPKGCYYMQIRKKTRQMLGMIEKKELDAARALSNKLLSDATELAYPAKIYLTN  
TLAMISAEGENARCLEYAHRVQKQIPVRDDGQPAEDLLPAEHAFAMEQRAKADALSERCSDEK

RL057

DNA sequence: (SEQ ID NO: 36)

GTGCTGGTAGAGCGTTGCCGACTGATGTTGAATTGCCGGGAGCTGAGCCTTGGCTGCCGGCGCTGCCCGCAGCC  
CCAGGGTAGCACCTGCTTGTGCGACAAGGCCCTTTGCCGCCCCGGTACGCCAGAGCTGATATCCTCGCTACCGCG  
CTGGTGTGCTTGTATGCTGCTCAGCAAGCCAGCCGGCTTTCAAGGTAAGCGTACGCCAATACACCTTACTTA  
GGTTGA

Protein sequence: (SEQ ID NO: 158)

VLVERLPTDVEFAGELSLGLAGRCQPQGSTCLSDKASLRPRYAQSLISSRYRAGAACMLLSKPAAGLFRVSVRPIHLYL  
G

RL058

DNA sequence: (SEQ ID NO: 37)

ATGGATATTGCCCTGGAGATTTAGCGCTTGAACAGCTGTTGCTAGAGCCGGATCGAGAAAGAATGATCGACTGCTTAA  
ACAGCTGCTTACCGAAGACTTCGTTGAATTGGAGCTATCGGAAAGCTGGACAAAGCGGAGGTGATCGTGGGACTAA  
AATCCCAGACTTGGATCAAAGGACAATCGAGGATTCTCAAACCTGCGTGTGCTGAGATGCTGCGTAGCAACGTAC  
CGATGCCGTATCAAATGCTAATGGCGATGAGTCGTTATCAATGCGTAGCTGTTGGAAAACCTACGAAGATGGTIG  
GCACATGGTGTTCACCAAGGCACGGAGGGCTCCGAGTAG

Protein sequence: (SEQ ID NO: 159)

MDIRLEI LALEQLLLEPESRKNDRLKQLLTEDFVEFGAIGKSWTKAEVIVGLKSQTWIKRTIEDFKLRLVADGVALATY  
RCRHQNANGDESLSMRSSVWKTIEDGWHMVFHQGTRVSE.

**FIGURE 30C**

**RL059**

DNA sequence: (SEQ ID NO: 38)

```
ATGACTCCTGCCAACCTTGACAGATGACCCCGAACAGCTCGTGCCTGGCGCACAGCGTTGCAGTTGCAATC
CCAGGTCGAGCGATGAGCAGGAAATCCCAACAAATGAAACCTCATCGAACAGTTCAAGTTGAAATCGCTCTGCTCA
AACGCCACAAGTTGCCAACGCGAGCGAGCAAATCAGTCGGCGAACGGCAGCTTGCTGGATGACCTGCTGACACCGAC
CTTGAAAGCTATCGAGGCCGAGCTGAAACAACCTCTTCAGCTTGCCACAAGCGAGCCACGGCAATCCCCAAAGCTTC
GCCATTGCGCCGAGCTCCCGCACGGTGATTGCCACGAACTGAAAATACCCAATGCCCTGCCCTGCCAACCTTC
AACCGCATCGCGAGACGCTAGCGAGAACGCTGATTACCGCCGGCGTGTACCGTCAGCAACATGAGGGGCAA
TGGGCCGCGCTCAGTCGAAACCCCTGATGCCAGGCCGGCGTGCAGGCTTATGATAAGGCATCCCGACCGCAGG
TTTGTGGCCCACCGTGTGGCGCAAGTTGCCGATCACTGCCGCTGTACAGACAGGAAAATCTTGGCCGCGCG
GGCTGCCAATTGCCCGCTGACCCCTGGCGAGTGGCGAACAACTGGCGTGGCTTCAGCCACTGCTCGATGCACTG
CGTGAAGCCGTGTAACCAGGACGTGATCCACGCCATGAAACACCGGTGCAAATGCTGCCACCAGCGAGAAGAAAAC
CCACCGGGCTATGCTGGGCCAACGACGCCGTTCCGGCTCAAAAGCGTGGTTACGACTTCAGCCCAAGCC
GTGGCGAGAACATGCCACGCAACTCTAGGCCGACTGGAATGCCAGCTGGCTGCGACCTCGCTGATAACAGCC
GGTTTGAACAAGGCATCACTGAAATCGGCTGATGGCTCATGCTGCCAACGTTCTCGACCTGCTGATAACAA
AAGCCAACGGCCGAAACAGGGCTGCACTCAATTGGCGGTTGACAGGTTGAACGCCAGGCTGGGACATGAGCAACG
AAGACGGTGGCGAATACGTAGGAAATGCCGATCAGCAAAACACTGCTGACTGGATGTTGCCAGCGGAC
CTGGTGCCTAACGGCTGGGCCAACAGCTAAAGCCCTGCACTACAGCCTGAAACGCTGGGAGCGCTGACGCCCTACCTGGA
-CGATGGGCTGTGCCCCATGACAAACAAATCAGGGAGAACCGAGATAACGGGGCTGGCGCTGGACGCTGAACTGGTTAT
TTGCGGAGTCGCTGCCAGTGGCAACAGCAGCAGCTATCATGAGCTGATCCAGTCCGCTGCAATGACGGGATGAT
CCGTATGCCACTGTGAAAGGAGCTGCAACTGCCCTGCCGACGTTACGGTCAAAGACATGCCAGTTGCCGATCA
GTGGTACAGATCTAG
```

Protein sequence: (SEQ ID NO: 160)

```
MTSSPNLDQMTPEQLRALAAQALQLQSVEAMSRKIRNNETLIEQFKFEIALLKRHKFAKRSEQISSAQSLDDLLTD
LEAIKEALKQLLPASQAEPROSPKRSPPLPQFPFRTVIRHEPENTOCACGCOLRIGEDVSEKLDYTPGVFTVEQHVRGK
WACRQCTLIQAPVPAQVIDKGPITAGLAAHVMVAKFADHPLPLYQEKIFGRAGLPIARSTLQAQWVGQTGVRLQPLVDAL
REAVLNQDVIHADETPVQMLAPGEKKKTHRVVWYASTTPFSALKAVVYDFSPSRAGEHARNFLGDWNGKLVDDFAGYKA
GFEQGITEIGCMAMARRKFFDLHVANKSQAELQALHSIGGLYEVERQARDMSNEDRWRIQMAVPISKTLHDWMLAQRD
LVPNGSATAKALDYSLKRWGAALTRYLDDGAVPIDNNQVENQIRPWLGRSNWLFAGSLRSCKRAAAIMSLIQSARMNHD
PYAYLKDVTRLPTLRSKDISQLLPHQWVQI.
```

**RL060**

DNA sequence: (SEQ ID NO: 39)

```
ATGATCCGCATCGATCGCATGGCTAGGCCACCGAACCGATGGACATGCCGCCGGCACCGAGACGGCATTAGCCCGGGT
AATTGCCGTGTTGGTGCAGGCCAACGCCGACTGCCCTATCTGTTGCCAACGCCGGCTAACCGAATGAAAGTGTGG
TGCACGATGCCGTGGCAGTGGCTTGCCGCCGCTGACTGAACCAAGGCAAGTCCACTGCCGCCGGCATGCCATGGC
TGCAGGTCGAACTGCCACGCCAACAACTCCAGGCCCTGGTGTGGCTGGCGTGGCACAGGCCGTGGCACAGGCCGGTGT
GATCAGCATGCTGTAA
```

Protein sequence: (SEQ ID NO: 161)

```
MIRIDAIWLATEPMMDMRAGTETALARVIAVFGAAKPHCAYLFANRRANRMKVLVHDGVTIWAARRLNQGKFHWPGIRNG
CEVELDSEQLQALVLGLPWQRVGTGGVISML.
```

**RL061**

DNA sequence: (SEQ ID NO: 40)

```
ATGCCCAACGAAGCTCTTACCGAACCGTTCAAAGCCAGGTGTTCAGGAATGCCCTGCAACCTGGGCAACGGTGTGTC
CAGTGTGCCATGCCACGCCATCAACGCCAACGCTTATGCCAACGCCGGCTAACCGCAGGCCGAACTGCTGATTGAACTGCCCATG
CCTCGTACCGCCCTTGTCGGCTGAAAGGCCACCCCTAACGGCCAGGCCAACGTCAGTGTGATTGAACTGCCCATG
GCCGCCAACATGATCACGGTAAATAG
```

Protein sequence: (SEQ ID NO: 162)

```
MRQRSSYPKPKAQQVQECLQPGATVSSVAISHGINANVIRKWLTLYRDQPVPAISLPAFVPLKATPKRPAETSVLIELPM
AGQMITVK.
```

**FIGURE 30D**

RL062

DNA sequence: (SEQ ID NO: 41)

```
ATGGCTTATCTCTTATCGTAGTCACTGGCTCCGCCTCACGAAACATCTGGCGTTGAAACCGCATGCCAAACGCTT
GCAGAAGAACCTCTTCTGTGTTGAAACAGAAATATCCACTCAAGGTTGCACCATGCGTAGCAGTTCTCGCGGCT
TCCGCTACTCGCTGATGTCGATAAACTGGAGCAGCACATTGCATGAATAGAAGCGCTCCATTCTGGGTGATCCGTGGC
CGCAACGATAACACACCAAGGGGTACTGGAAGCGCTATATTGTTAGACCTTGAAATACCGAGAAATGGCCCCGTCGTTT
TACTGGAACCCAAAGCACTATCTTCCAGGCTTACTGCTTCTTGAGCAAATGAGCTTAAAGAAACTACCCGGAC
TAATCCTCATCGAAACAAAAGAGACCTCAATCCTAACACCCATATATTGACGCAATAGAAAATTAGAAGTCGAAGAA
ACTCTAAATAATTTCGATTTCTGACTTGCAGACCGAAACCTTCCGTTAGTACCGAGGCTCGTGTGGAT
CGAGTCATTGTCAGTTATTGCCAACGACATCCAAGAGGAAATCGTAATAAAGGATGGTCACACTTAGAGATCA
GTGCATATGAGCATGCAAAGTCTCGTAATCAACTTTGGCTCTCAACTTCCCTGCTCCCCCTCTCCATAAAG
TCAGCGATCATCAACTCATTCAGCGCATACCCCTCCATTGGATCAGCCTCCCTCTGGCAAATATCTAAAGT
TGATATACCGCGACCCCTCTCGAAAAAAAGCTCAGAGGAAACCCCTACTTTATCTCATAAAAAAATTAGAGAATCGACAGT
TCCACACAGGCATTTCATGAGCATGGATGGCGCTATGCTGTACTCTTCAGGAATGATCCGGCTAGC
GAGGTACTAGCAGGAGTTATACACTGACTTTCTGGAAAGCAAGATAGAGACCATCGCTACCCACCCCTTATGTTTC
AGATGGAGCAGTCCCATGCTCCAAAGCTTCTAGGTTAGGGCCATACGGTATTGCAAATGGAATCACTGAAATT
CCGACGGGGATGGTCTGGGGAGTTCTATGGCTACAAGAACTCACTTAAAGTCAGCTCCTATCTAACGGAATACAGTTC
ATGGTAAAGCATGTATCACTAAAGTAA
```

Protein sequence: (SEQ ID NO: 163)

```
MALSLIRSLTASASRNISALKRDAKRLQKNSFLVFGTEYPLKVCQNAVAVSRGFRSLADVDKLEQHIGMNRSAFPWVIRG
RNDTHQGVLEALYCLDLEYTENGPVFTGNPKHSILPALVLFLEQMSFKLPLGLILIEKTSETSIQTHIFDAIEKLEVEE
TLNKFRFLDLRDRNLPVSLSTEARWIESIVSLLPNDIQEERNKGWSTHLEISAYEHAKSRNQVFGSSNFPVFLSIK
SAIYQLISGAYPPLWMQPSSEISKVDIRRPPLEKSSEETLILYLIKLENRQFHTG1SCEHESWRPYVVLFSRNDPAS
VILAGVIHSYFSWKQDRHRSPTLIVSDGAVPYAPKLLGLGGHTVIANGITEIPDGDGLGEFYGYKNSLKVSLSNGIQL
MGKHSVSLK.
```

RL063

DNA sequence: (SEQ ID NO: 42)

```
ATGAACGCTCTGACCAACCGGCCCTCGCCCTCCACCTGAAACATCAACCTGACCGACTTCATCGACGAGTTGG
CGACGAGCTCTGGAGTCGCTCAATCGCTCAACCCCCGGCTATACCGCTCCGTCACCGCTCACCGCAGTTGGTA
TGGACCGACTCAAGCGCAAGCCCTCGGGCCAGGGCGAGGTGTCAGGCCATCACCGCCCTGCTGGACCGTAA
GAGCAGGCCGAATCATCAACGCCAGATGGGCACCGGGAAACCATGATGGCATTGCTGCGCAGCGTCATGCACGC
CGCCGGCTATCGCCGACCCCTGGTCTCTCCCGCACCCTGCTACAAGTGGCGCCGAGATCTGGAGACCATCC
CAGCCGCCCGCTGGTACTCAATGGCCAGACTACTCACTCAAGCTGCTCAAGCTGCGAGATCAGATGGGCGACGCC
TACGACGGCCAGGACTTCTCATCTCGCCGCTGGATGGTTTCACTGGCGCTCCGCTGGTGTGGAA
GAAACGCGCCCGCCGGCCAACTGCTCGCTGCCGGATTGGGACAGGTCTCGAGGACCTGGAAAGGCACTGG
TCACGGTGGAGGAGTTGAGCTGGTACCGTCACTGTTCTCTGCCGTGGGGCTCTGGACGCTGATCCGA
CCAGGCAAGCCGACGGCGAACCGCGCGAACGATTCTCAAGTCAGTGTCCGGATACCAACCATGGCCCGTCA
GGCGAGCGCTGCTGAACGACTTCGGCGAGGACTTCCTGGCACGATGTGTTGGACAACGCTCTGGAGTTCATCAACC
TGATGGACGCCAAAGGCAACTTCGTTCTCAGCGATCGCGAGGCCAACGCTGGGATGGCTACTTCGACCTGCTGGTTC
GGCTTGGTGAAGGGCTACCAACCGACCGAGGTCTAACGCGTACCTACCTGATGGCTACTTCGACCTGCTGGTGT
GGACGAGGGACATGAGTACAAGAACAGCGCTCCGGCCAGGGCATGGCGTTCAGGCAAGGCACGGAAA
CCGTGCTGCTGACCGGAACGCTATGGCGGCTACGCCGACGATCTGTTCTCATCTGGCATCTCACCCAGCGC
ATGATCGAGGACGGCTATGGCCAACCGCGCCAGCGATGGCTCCCGCAGCCATGTCGTCATGCGGACACGGTGT
GCTCAAGGATATCTACACCGAGCGCAAGGTGATTGCAACAAGACAGCGCCGGCAAGAACGCTCTCGTACGCACGGTGA
AGGCTCCGGCTTCGGCCAAAGGGCATGCCACCGCTTGTATGGCTTACCGTGGTCTGAAGCTCAAGGATATTGGT
GGCAACGTTACTGCCCCGACTACCGAGGGAGTTCTACGACCTGGCCATGGCGCTGGCTGAGCGAGCTGGCTATCAGGCGCT
GGCGCCACGCTGACAGCGAGCTCCGCCAGGCTCTGGCGCACGGAGATACACGCTCTGGCGTGGCTCTCAACGTC
TGCTGGCTTGGCGGACTGCTGTTCTGACCGGGAGATCGTCAGCATCGCCGAAACCGGGCACACTGGCTTCTGCGCA
GCGATCTCGGTGACGAGCAGGTGATACCAAGGAGCAGGTGCTGGTGGACCTCTGCTTCTGAGGAGAAAGCGAAGGGCCG
CAAGGTCTGGCATACACCGTCTACAGCGGACCGCGACACCACGTCCAGGCTGAAGAAAGTGTGCTGAGCAATCCGGC
TGAAGGTGGCAGTGTCTACGTGCTTCTGGCTGATACCGCTCGACCGCGAGGATTCGATCTCGACCGGTGATCGCGGCATC
GATGTGCTGATACCCCTGCAAGCAGGCCGGGGAGCTGGTGAAGAACCGGGCTGACTTGTGACTTCCCGACCATCGCGTTCTGCAAAC
GGGCTACAACTGTAACCCCTGCAAGCAGGCCGGGGCTGCTGGCGGATCGCGGAGAAGCAGCCGGTGGGGTGT
TCTTCGGCTACGCCGGCACTCGCAGATCACCTGTTACAGCTGATGGCAAAGAAGATGCTGTGGCTAGAGCACGTCG
GGAGACGTTCCCGAGTCAGGTCTGACTCGTTGAACCGAGATGGGATTCTGTTGGAGATGGCGTGGCACGACAACCAT
CGCAGCATGA
```

**FIGURE 30E**

Protein sequence: (SEQ ID NO: 164)

MNALTQPAALAASHLNINLTDIFEGDELLESLNRSNPPVYTGSVNAHRQLVMDRILKRKFAAQAEVQQAITALLDRN  
EQAGIINAEMGTGKTMMAIAAVMHAAGYRRTLVSPPHLVYKWRREILETIPAAARVWVLNGPDTLLKLKLRDQMGA  
YDGRQEFILGRVRMRMGFHWRLACWKKRAAGGQLAACPCGVLEDLEGNLVTEEFERGDRRRTCSSCRGALWTLIR  
PGKPDGGNRRATILKSMCRIPTIGPVRERLLNDFGEDFLATMLVDNVSEFINLMDAKGNFVFSDRQAKRMERSMANIEF  
GFEGGGYQPTEFIKRYLPDGYFDLVLDEGEHEYKNSGSAQGQAMVLAALKARTVTLTGLMGGYADDLFYLLFRILTOR  
MIEDGYRPNARGSMAPAMSFMRDHGVLKD1YTERDGSHTKARGKKLSVRTVKAPGFGPKIHRFVLPFTVFLKLKD1G  
GNVLPDYQEEFIDVPMAPEQASAYQRLAATLTAELRQALARRDTTLLGVVNLVNLAWPDCCRPEIVKHPRTRDTLAFVP  
AIFGDEQLIPKEQVVLVLDLCEEEKAKGRKVLAYTVSGTRDTTSRLKKVLEQSGLKVAVLASVDTARREDWILDQVDRGI  
DVLITNPELVKTGLLDFPTIAFLQTGYNVYTLQQAARRSWRIGQKHPVRVVFAGSSQITCLQLMAKKIAVAQSTS  
GDVPESGLDSLNQDGSVEMALARQLIAA

RL064

DNA sequence: (SEQ ID NO: 43)

ATGGCCCTCATGTTCCCGCGTTGGCGCGAACCTTGACGCACGGCTACTTCCCTACCGATGAGGTC  
ACCCCTGAAACGGCCTCTGCAGGCCCTCACTCTGCCCGTCGGGAAGGATGAGGATCTGTGACCCCTGCGCCGGTGAGGG  
TCTTGCCTCGCTGAGGCACACACCCCTCGCGCGATCAGGTCACAGCTCGAGCTTCAGCAGCCCTCGCTGAGTACGACCGCGAGCGCG  
CCGACCATGCCCAGGATTGCTGACCGAGTCAGTGCACAGTGCACCTTTGCAACCATGATCAGCAGGAGTCGTTCGGA  
CTGCTCTGGCTCAACCCGCTTATGGCGACCTGGCGACCTGGCGCTGCGAGTACCGGGCGCTGAGTGGTCTGATTGTTCTCACT  
CCGCTCTGGAGAACGGCTTCAACCGCGCTGCCGTTGCTGAGTACCGGGCGCTGAGTGGTCTGATTGTTCTCACT  
ACGTCTTGAGCATGAGCTGACTGGCTGGTGAGCAACCACCTCACCGGCTGCGCATCTACGCAGCCGGATCCTACCC  
TTCAAGCAGGGTGTATCTCGGCATCCGGTCCGCGAGGACCTGGCCGGCGACGCCATCAGGTGAGGTCTCG  
CTGCAGGCGATCGGAGCGGGCCAGGAAAAGGCGAGGAAATTCCAGCGGCTGGCGTGGGAACCCCTACGTGGTCTCG  
CGGCCACAGCGAGCTGGGACACTTCTACCGAGTAACCTCTGGAGCCGGAGCAGTTCGCGCTGAGAATCCAGCGCTGCGA  
GGTCTCTGGCTGACTTCAACCTGCACTTCGCGCAAGCGGGGCTGAGCGCGCCACCGAGCTCCGCGAGGCTGCTCGCTG  
GCACCTGCCCTGCCCTGGCGCGCAATATCTGGCTCTGCGATCGAAGTCGAGTGGCCGGATCTGGTCTGAGG  
GTGACACCTACAAGGACAAGGTCGCAAGCGGAATTCAACCGAGGACGACGGCAACATCACCGAGGTGAGGATCCTC  
ACCGACCGTTTACATCCCGATCATCGGGCATGGGAAATGACACCCCTCTCGGCTCAATCAGGGCCGCGTCTGACCATCAG  
CTCCCTGCCGCCGACCAAGGAAGACTGAAGAGGCCAACCTGAGCCGGCCCGCACCGCTGCTGATCAGCC  
CTGGCCGGTCTGTAATGACCGCAGCGCTGAGCCACCTGGTGAAACCGGTCAACTCAACCCAGCGCCTTGTGAAACCG  
CATCTGGCGGGAGATTGGGAACCTGGACAGGAAGACTGGAAACACCAACCGAGAGGCCCTGAAGTTCGGCAGTCGG  
GCTGTCGCTCTACGACATCGACGCCGCGACGAATCCAGGCTCTGGATCATCACTGAGGCAGACCGCAGCTCAACCACCG  
TTTGCTCCCTAGCGATTACTGA

Protein sequence: (SEQ ID NO: 165)

MALMFPRILARNFARNGYFPTEVTLERALQALTLAPSGRMRICDPCAGEVALAEEAHTLGRDQVQALAVEYDRERADHA  
RGLLDRVLHSDFDTMISRQSFGLLWLNPPYGLDVAHDHSGASQYQGSGRRLERKAFYQRCLPLLQYGGVMVLIVPHYVLD  
DELTGWLNSHFTLRIYAAADPTFKQVVFIRVRRQDLARADANQVRSRLQAIAGQKAEIIPAAWPWEPYVVLPAT  
ELEHFYRVTLPEPEQFAGEIQLRLGLWPDFNLHFAQAGLQFRPPVRELSRWHLALALAAAGAISGVVRSKSGRILVVKGDTY  
KDKVRKTEFTEDDGNIITEVRILTRFIPIIIRAWEMTPSSVNVQGRVLTISSSAATTEEEAEPQPEPAPAPAPLLISPGRV  
VMTAAVSHLVETGQLNPAPLLKRHLADGWGTLQEDWNTNQRALKFGDRLLSSYDIDAGDESRLWIITEADRSSTTLLP  
SDY.

RL065

DNA sequence: (SEQ ID NO: 44)

ATGCCCACTCCCACCCCGCTCTACCAGATCGAAGAGTGTCCAGACCTGTACGTGACGCCCTGCGTGTGCGACGAGCAGTG  
CAACCTGGCTTTCTTCGCCCTGGGCGCGACACCGTACACAAAGAGTCTGGCCAGGCTGACGCTGGCCGGGGAA  
AAAATGGCATGACCATTCCACATCATCGTGGACGGCCCGCTTACCTGCTTCCCAAACCAAGGATCTCTGGAGAAA  
CCGACCAACCCGTCAGTCCGGCGCACGGTTCGCGACGCTGCTCAATCTTGGCTGATCGGCGCCCTCGGCC  
CGACCGAGGCAATCACCTCGCCTTCGCACTCTGCAAGCGCGATGAGGATCCACCCAGAGGCTCTGGCCCTGGTGTAGGG  
AAACCTGTCGCTCCCCCTCTGCACTGGCGCGAGCCGGTGTGGAGGTTCTCACCCAGCACCAGATGTTGACGGCC  
CTACCCGGAGCGATCGCAACGTGCGCTGGCGACTGCCCTGCGGCTGACGTGCTTGTGAGGCCACCCCTGGTGTAGGG  
AATCCGCAAAGCATTCTTACCAACCGATGTCAGCGCAAGCCTGA

Protein sequence: (SEQ ID NO: 166)

MPSPTPLYQIEECPDLYVDACVCDEQCNLVFLSAWRDVTQEFRLARLTGREGENGIDHFIIIVDGRRLPVFPNQDLLEK  
RTTRQFRGTLFGSLLNLWLFDRRASAPDRGNHLAFAALLQRDEDPHQRLWPLVMETCPLPLLQHWRPVMELTQHQMLTA  
LPGTIGNVCAWRALALRVDVLEPTLGEVIRESILTDQAQQA

**FIGURE 30F**

RL066

DNA sequence: (SEQ ID NO: 45)

```
ATGAATCCATTGTTACCAACCTACCCAGGAAACCCCTCGCTACCTCGAGGACCAACTGTCCAACAACGACGTCGCCGG  
CGACGACGAGCTCATCGACTTGTTCATCGAGGAGCTGTCGCTGACCTTGAGCAGCGGAAGCGGCTGTCGCGCTACGCG  
ATCAGTACCTCTGCCAGGTCTTCTGATCGCCAAGGGCGCTGCACCAAGCCGATGGACTCAGCTCGACCCACACC  
AAGAGCGTCGGTAG
```

Protein sequence: (SEQ ID NO: 167)

```
MNPLFTNLTQETLAYLEDQLSNNDVAGDDELIDLIEELSLTLEQAEAAVALRDQYLCQVFLIGQGPLHQADGLSFDPHT  
KSVR
```

RL067

DNA sequence: (SEQ ID NO: 46)

```
ATGGGATGGCTTTCTCACATCAGACGAAGGAAGACCTGCTGCGTGAGCTGCTGGCCCCAACAGTACCTTCGAGGCAG  
CACCGAGGTGCTGGCACACGCACTCCGGCAATGAACCTTGACTGTCGTAACCGAACATTTCACCTTGCCGGATTCT  
ATTTGCCAAGCGCCGGTCACTCGATCACCATGATCGACGCTGCACTTGCTGGACTGCTGGCCGGCAATGGGCTAC  
AAGACCATCCGGAAGCGCCGGCCGGTCACTACGGCTGTCGCTGGAGTTCTGGACCTGGCTACGATGAGATCAA  
CCAGGAATGGCGTAAACGCGCTGACGACGAAACACCAAGCGTAA
```

Protein sequence: (SEQ ID NO: 168)

```
MGWLFSHQTKEDLLRELLAPLPTSTFAGSTEVLAHAVSGNELWTVVKRTFHLAGFYFGKPAGHSITMIELHLLDCSAGQWGY  
KTIPEASAGPFFYGCPLFQLDLAHDEINQEWKRKLTHEHQA
```

RL068

DNA sequence: (SEQ ID NO: 47)

```
ATGAAATCGATCTACAAACACCCCCAGGGCTTCAGCGAGGAGTTGTGCTGGTTGCGCCTCGCTGCGCGAGGTGCGACTGGA  
CAATCTGGCTGACCAGTCCCGCGCGAGTGTGCGACCGATCCGTCGACCGACGCGCATTCGCACTGCGTGAGCGGG  
TGAAGACCCCTTCGCGCGAGCATGGCGCGACAACGAGCCCTGGTTGACTGCGACTGGCAGGCCAGGAAACAGCTTAC  
CGGCTCCTCCAGCGCCCTGAGCGCGAACACGCGTAA
```

Protein sequence: (SEQ ID NO: 169)

```
MKSIYNTPGFSEELLLVCASLREVGLDNLADQFRAAVFDRSVVDQAIIALRERVKTPSPEHAADNEPWLYCDWQARQTA  
RLLQRLERATR
```

RL069

DNA sequence: (SEQ ID NO: 48)

```
ATCCCCCTCACCAACGATCCCGCTTGGCGGGGATCATCCTTTCGCAGGTACATACCATGATCACAGTTCCGGACAGTTGGC  
CATTCGAACCATCAACGGTCGCTATGGGAGTTCAATGTTGGAAAACCTGGAACCTTCGATCGCTGGAGTTCATCATCAAGG  
ATGCCCTCTGGATCAACACACCGAAGGCAAGTACCGCGGTGATTTCGTCATGCCAATATCCGCCCCCACCACACTTCC  
GCCGGCGGTGGCTAGTCATCGAGATCCGCGCCATAGTGGACAGCATGACGCTGAACGATATGGACAGCCTCAGCGACGA  
GGAGGTAGAGCGTCTTCGGCAATGAGGTGGATCCGCTCGACGAAGTGGCCCTGCAACCCAGGGACGCGCCTTCGGTATG  
CGATAACACCAAAGTCGGCTCACCCAGAAGTGAAGCCTCTGTCGACACAGCGGGATCGAGAAGTGTGGACGGTCTGGCCGCT  
GACACTCCGGCTCTGGAGAGCAGGCCCTCTGGACACAGACGCGGATCGAGAAGTGTGGACGGTCTGGCCGCT  
AGGCAGAAATGTCAGCTGGACACACGGCTGACCGCAAGCGACTACGCCAACAGTGCCTGCGACTCGGCCGCTGGGCT  
ATGAGCTGACTTCAAACACAGGTGTCGACCCGCAAGGAGGCCGATGA
```

Protein sequence: (SEQ ID NO: 170)

```
IPSPRSRFGGIILFAHTMITVPGQLAIRTINGRYGEFNVGKILWTSIGEFIIKDAFLDQHTEGKYRGDFVIANIRPHHYS  
AGGRLVIEIRAIVDMSMTLNDMDSLSDDEVERLSNEVDPPLDEVPEIQLPTVVAIP
```

RL070

DNA sequence: (SEQ ID NO: 49)

```
ATGACCTCTCAACAAACACTCCACGCGCAGGTACACTGCTGCGTACCTCAAACCTCCGATCGTTCTCACCAACGCGGC  
CTGGCTCGCGCTGGCTATCTCGCCAACCCCTGCGCAGGGTCGACGAGATGGGACCCGGCTGGCCAGTGTGCGTTCAAACCG  
CCTGGCAGGAGCTTCTCCAGCGACCGCGAACGACATCAAATCCACCTGTAACCAAGGAGGAAGAGGGCAGGAC  
CGCGCGCTGCGCTGCTGGTTCTCTCGATAGTCGAGCCGTCGGATGAGCCTCCTACCTCGCGATCGAGTGCAGGAAGA  
GTGCCCTGCCGAACACCCGGTTACCGAGTAG
```

Protein sequence: (SEQ ID NO: 171)

```
MTSLNNHSSAGHTAAYLKLPIVLTLNAWLRLVYLANPARVDEMGRTRLASVVTQAWQELSLOPTAKHIQFHLYHKEEGQD  
RALALLVLIVEPSDEPSYLRIELQEECLAEHPVTE
```

```
PKSPSPQSKPLCLAAATRDPFGM
```

```
DTPAPAEQAASLTDADAEFLGTVWPLGEIVKLDTTVDRKRLRQQCVRLGALGYELDFKQQVWTRKEAA
```

**FIGURE 30G**

**RL071**

DNA sequence: (SEQ ID NO: 50)

ATGACTCAACTCAACCGTTATTCGGCTATGAGAGTTCCGCATCGAGCGAAACCTGCAGATCACTGACGAAGGCAA  
CAATCTACCGTCTACCGCTCTGCATGAAACCCAGCAGCACCTCCAGACAATTTTCAGTGCAGCTGTGCTACT  
TCAATAAGATTTCCGGCTGGTAGTCCAAGAGTTAGACGATGAAAGAGTTGAAAAATGCCCTACCAAGGAATAGTGAGA  
AACGTTACAGTACAGCTACCGTAGCGAGGAGGGCAGAAAAAGCTTATCGAGATCAACTGACCGAAGGCCGA  
GAGTGTGCTTCGATACCTTCGTTCCGGCGGTTATAACCCCTGCTGGAGATCAGAAAACACATCTACCCATCAGCG  
CGTGGAAATGCCCTACGAAAGGTTCTGACCAAGATGCAATCCGCTGCCCTCGTGTGGTATCGCTCTCTGGTGT  
AACGAGCACGGTGCCCTGGGTTTCGCTTGACAAACACCCCTGGACGGATGAGTCTGAGATGACCGC  
AGCCGCTTCGACAAAGAACAGCTTGCTTCGGCTCGACGAAACACCTGTGATCTGCTCACCTCGCGGGACAAGCAG  
ACATTCCGCTCTGGTACTTGATCCATTGCGCCACGCTCAAGGGCTGCCCTTATGACGATTGA

Protein sequence (SEQ ID NO: 172)

MTQLNPFI~~RGYES~~FRIERNLQITDEGNL~~PCY~~RALHETQQHLPDEYFQCEL~~CY~~FNNDFAVVVQELDDERVEKCPHQGIVR  
NVLYSIYGEQDGRKKLIGDQYS~~LE~~AEVS~~V~~RYLSFGGGYNPCWEIRKTHLPISAWNSLYERFSTKMP~~IRL~~PSVL~~S~~FWC  
NEHGAVGFLRLHNT~~P~~WTDECLEI~~EM~~TAALRQEQLAFGLDEHLDL~~LL~~LAGQADIRLLVLD~~P~~AP~~T~~LKG~~L~~PLYDD.

**RL072**

DNA sequence: (SEQ ID NO: 51)

ATGGGACTGGT~~T~~TTCC~~T~~ACCGAAAGGAGAA~~T~~CCATGCAATACGGAAAGCTGGC~~T~~CGCC~~C~~ATCTCAGCCTGGAA~~C~~  
GCCGTTG~~C~~AGGTACTT~~A~~TAAGAAACCGT~~G~~CTT~~A~~CTACATCGG~~C~~ACTT~~C~~TGACGAAGAAGGACCAGCCTCGCGAGT  
CGGTTGAATATTACCC~~C~~TACCG~~G~~AACTTG~~C~~CC~~A~~ACAGG~~C~~ATTAGACCACGG~~C~~ACTTG~~G~~ACG~~C~~ACTGGAA~~A~~TTAA

Protein sequence: (SEQ ID NO: 173)

MGLVFP~~T~~ERRITMQY~~G~~KLALAHLS~~L~~PLQVLM~~N~~KNRAY~~Y~~IGTSDEEGP~~A~~SRESVEY~~Y~~PS~~R~~ELAQ~~Q~~ALD~~H~~GTWTQLEY.

**RL073**

DNA sequence: (SEQ ID NO: 52)

ATGGGAAATGTTGGGATTATGCCAGGGCAGATACCTGGGATTGTTGGCCAGGAACAGCCAGGGAAAGTTGCAGA  
ACTGACTG~~T~~GAGCACGACTCGTCTCGACGTCGCTGAGGCTAACCTCTCAACTCCGGCAGGGCGGGCAGTTCTAGC  
ATTGGATGTTGCTCATGATGATCTCAGATAATGGAGAACACCACGCC~~T~~GGGGAGATGGT~~G~~CCCCCGGATGGGTA  
TGC~~G~~ATGAGAGTGGC~~G~~CATAGCGTAG

Protein sequence: (SEQ ID NO: 174)

MGNVWR~~L~~CQGRYLGIVVGQEQPGEVAELTAEQQLVLDVAEANLLNFRQGGFYDLDVAHDDLQIMENTTPWGEMVPPGWV  
CDEEWRIA.

**RL074**

DNA sequence: (SEQ ID NO: 53)

CTGACGGCAAGGTGTTCTCGCTTCGTTACGAAACTGGAGAA~~T~~CATCATGAGCAACACACCCAAAGCCAAAGAAC  
CAAGTATTTCGACCTCGCACACCACCGTATCGGCTACCTCAATCGCATCCG~~C~~GAGGTACCGATCCGCCAGGGTGAACCAT  
TCCTCGCGTAACCGCTCGAGGCCCTCATGGCGGGCAGACAGCTGGAA~~T~~ACTCCTACATGACTGCAAAGTGGT~~C~~GG  
GCC~~C~~AGGCTGAAAAGCTTGTCCGCC~~T~~TGCAAGGAAGCAGTCGAGGCCAAGAGAAGGTTCTGATTTCCTCGTATCGG  
CGATATCTGGCGGATCCCTCATCCACCAGAAAGCGAGAAACAAGGCAAGCCGACGCAAGCCTCAAAGGCCGGCTGC  
TCTTCATCTCTGGATCAAAGTGGATGGCACCACCGTCTACGATGCGAAGGAAGAAGCTGAAAAGGCCAGCAAGGCAA  
GGCGAACCTCAAGGTGAGCCG~~C~~AGCCCCG~~T~~GAGCACGCTGAGAACAGCCGCTGCTTG

Protein sequence: (SEQ ID NO: 175)

LTGKVFLRFLRN~~W~~IIMSNNTQAEQAEKYFDLHTGIGYLNR~~I~~REVPI~~R~~GE~~P~~FLAVTVAALHGAADSVEYSYIDCKVVG  
AQAEKLVRRCKE~~A~~VEAKKKV~~L~~ISFRIGDIWADPFI~~H~~QKGEKQGKDASLKG~~R~~LLFIS~~W~~IKV~~D~~GTTVYDAKEEAEKAQQGK  
GE~~P~~QGE~~P~~AA~~H~~AEQAAA.

**RL075**

DNA sequence: (SEQ ID NO: 54)

ATGTCCAACCAATCCACCGCTTCGAAATCGGCTT~~G~~CC~~C~~CC~~T~~CGCAGTGTGCGTGAGTCCGCAGAGCGCTCAGTCG  
CC~~C~~CTCCGGCTCGTAGTGC~~A~~AGCACAAGCGCCGGTTGCGTTGAGAGTCCAGCGC~~A~~TGATCCTGCC~~T~~CTGCC~~G~~CC~~C~~CGA  
CCGCTGGCGAGCTAGAACACATCAGCGACATCCAGCCATCGTCCGGCTGAAGAAGGTCAACCTGAATGACTGGTATCTA  
GCCAATACCGCGAGG~~T~~CAAGATGGGTTCCCTCGACCCATTGATTGACCCAACTCCGAAAGCGAAAGCTGAAACGCC  
AGTCAGGAAGGAGGCTCAAGATGGGTTCCCTCGACCCATTGATTGACCCAACTCCGAAAGCGAAAGCTGAAACGCC  
TCCAGTTAGAGTCCCTGAACGATCATGAGATTGCTTTG~~C~~CAGCACCTCTGGTAGCGCAGTCTCTGGGA~~A~~CTCCAT  
CGCGTACTCAGGAGCAATACCAACACGCTGGCAGGACTACTTG~~T~~CCACCATGACGGATGAA~~C~~AGTAGCTGCTCTCGG  
CCGCTAA

**FIGURE 30H**

Protein sequence: (SEQ ID NO: 176)

MSKQSTSFEIGFALGSVVFRRRALSRPPVVVQAQAPVALRVQRIDPAFLAGPTAGELEHISDIPIAVRLKKVNLNDWYL  
ANTREVOKPKRARKPKPAKATAKAETPVRKELKMGSLDHJIAPNSESEMGRPPLQLESLNDHEIALLPAPPGSAVSWELH  
RRTQEQQYQQRWQDYLSTMTEQVAALGR.

RL076

DNA sequence: (SEQ ID NO: 55)

ATGGTGTTCCTCCTGCAGGTTGAGGGCCGGAGAAAAACACTGGCCCTGGGGGAAGTGGATTCCCCGCTGGGTTGGGA  
AGGGAGCTTCTATGACCGAGGCCACCGACCGCTTACAGAAGCTATCGGTCTGGGTTGGATCAACACGGTGGGCT  
GTGCTGCAGCATTCGGATCCGAGCTGCATGGGGCATGTCGTGACAACGTCAGCAGATCACCGCTTACATCGAAGC  
GGGGGGCGAAGTCAAGGTCAACGGCAGGAGGGGAGCGGTGAGCAGGGGAGAGCGAGGGCGGAAGAGCGCGGCTGG  
TAGAAACCCCTGTCAAAGGTTCCCAAGCCGTGCTGGAGGGAGTCAGTGAAGCCACTGTGGTTGAATCGTCGATCCC  
TGGCATTGATCGTCGATCCCATTACCCGGCAATTATCGGCTTGGCCAGCAAACAGTAGGCACGCATCCGCTACA  
AAGGGAGCCCTCGGTATCACCGGGGGCACCGCAGGGAGAAGGATCCGATGGTAGCTGATAGTCTGGAGCAGGA  
GCATCAGGCTACCCATGGAGAGGGAAAAGGAGGGCGTAACACCAGTACGACCCCTAAATCGAGGAAACACCGAACCT  
CTTGA

Protein sequence: (SEQ ID NO: 177)

MFLLQVEGAETKTLALAGKWIPIRVAEGSFYRPRPTDRATRSYAVLGWINTVGCAAAFRIRAAGHVA  
DNVSRVHRS  
GGRKCQGQAGGGADAAGGERGRKSAAGRNPVKGFPSPRSVWKGQSQVSHLWLNRRSLGIDRLLPITRPLSWLGQQTGVTHPRT  
KGALRITGGPPAGRRIPMGSILIVLEQEHQATHGEKRRGRNTSTLKSRKHRTS.

RL077

DNA sequence: (SEQ ID NO: 56)

ATGCCGCTGATGGATCGTCCTGGCTCGCCTCATCACGGGACCTGGCTGAGTGACAAAGCGACCGACGCGACCTC  
GAGCGCCGAACTGGCCGGAGTCGACACCCCTGGCAGGAGCTTCGCTCTCCGGTCCAGTCTGGCGAGTAGCACACAG  
CCAACCCCGGTTTACCGGTTGCGCCGGACTCCGCTTGGTTACCGGCTGGTCCGCAAGCCAGCGCGGCTTCAG  
GGCTACATCGCCGCCGGCACCAGCTACGCCCTCATCGCCCTGCCGCCGGCTGGCGGGCTGGATGCTGGTAC  
GGAATCCGACCTGGTTGGCGTCAGGCCAACGGCAGTTAGTCACGCGCCCTGGAGGCCACTGTCATTGCGCTCCCTA  
CGCCCATCCCGAGGGCGCGGTGGTCGGTCAAATAA

Protein sequence: (SEQ ID NO: 178)

MPLMWIVLVLAITGTWLSVQSDHATSSAELAEVDTLARSLLLFRSSLAEYAHANPGFTGSPADSALGLPAWFRKPARLQ  
GYIAAGTSYAFIASPPAGLAAAVDAGTESDLVGVRRNGQLVTRRLGATVIALPTPIPEGAVVAVK.

RL078

DNA sequence: (SEQ ID NO: 57)

ATGAGGAGTACGCGCAGCAGTGGATTCATCTCGATCGAACTGATGATGCCCTCGTCGTGATGCCATCGCGACCGCCGG  
TGGCATATCGGCTCTGATGAGCTACCTGGACGGCTTGGACGAGCAGCACCGGCCACAGCACAAACAGCAGGTGGCCAAGG  
CAGCGGAGAAGTACCTGAAGGACAACCTCAGCACGGTTCTGGCAGCGCCACGGCCGGCGCCACGCCCGGGCGTGTACCGTC  
CCGATGCTGCCAACACCGTTACCTGCCCAGCAGCTTCCGGACACCAACATCTACGGCAGCAATACCAAGGTCTTGGC  
CCGCAAGCCGGGGCAACACAGCTGAAACAGCTGACCGTGGACACAGGGTAGCTTCCGAACTCTCGATCCGCC  
GGATCGCGCAGCTATGGGAGGCCACCGGGGCTACATCTCGAAACACAGTATCGCCAGGGCGCCCTGGCAG  
GTGCGCTTAAGCAATTCCGCTAGCGCTCCCGCCCTGGACATCTGGCAGCCGCTGTTCTCCAGGAACGGCGCCATCGC  
CAACGAGTACCTCACCGCAATCCGCTCCGGTACCTGAACTCAACCGGATGAATACACGCTGGACATGGGAGGCA  
ACAATATCGCCGAGCCGGGGCGATCACGGCCAGCGCAACATCACCCAGCGCGAACATCAGCGCGCAACGTGACA  
GCCACTGGTACGGTGAAGCCGGCACTGCTGACGGTGCCTGGAGACGTACACCGGAGGCTGGTCAGGACCCGTGGTGA  
CACGGGCTGGTACACAGGAAATGGGGGGCGGGCTGGTACATGAGCAGCACAGCACCTGGTGCCTGGATGAACACAGA  
ACGCTCACACCGCGCGAGATGAAACGGGCAACTGCTGCCAACGGGCTGGCAGGACATCAGCGCGCAACGGGACT  
AAAGCGTGGCACCGAACGGAGCAACTGCTGCCAACGGGCTGGCAGGACATCACCGAACCGGACTCTGGCTGTCTG  
CCAAAACGGGAAATGGGGAGCAACCGCCGCTCCATGCCCTGAACACCAACCGGCGGTGATCAAGGACTGGTGTACGGT  
TGCATGGTCAGGATAGCGCCATGGTGAACATACGACTACGTCGCCCTACGCGATCACCTGGCGGGCCGATTCTGGCAGT  
GGCTCAACAGACATTTGGCACCAACTACTCGTCTGGGCTAACTACTGAGATCGGCCAGGCTTCAACTACCCGGAACC  
CTACAAGACCCCGACTCGACCAACGTGACCGTACCTGCGTGAACAG

Protein sequence: (SEQ ID NO: 179)

MRSTRSSGFISIELMIALVVIATAGGISVLMSYLDGLDEQHAAQQQQQVAKAAEKYLKDNFSTVLASAGATAPAVITV  
PMLRNTRYLPGFRDTNIYQQYQVLARKPAANQLETLIVTTGGQVASELSIRRIAQLMGATGGYISKNTNTSIAQGA  
VALSNFGSAPGAGHLATALFFQDGAIANEYLYRNAVPGHPELNRMNTTLDMGNNIAAAGAATASGNITTSADISARNV  
ATCTVKAGTADVAGETYGGWFRTRGDTGWYNEKGGWYMSDSTWRSWMNKVYTGGEMKAGKLTAERTEVGEYIQL  
KGVATEGANCSPNGLAGITSTGLWLSCQNGKWGRTAASMRLNNTAGVIKDWTLCHGQDSAMVNVDYVRYAITCGGRFC  
GFNQTFGTNYSFGLITEIIGPGFNYPEPYKPDSTNVTCVN.

## FIGURE 30I

RL079

DNA sequence: (SEQ ID NO: 58)

```
GTGAGTGTGAACCGATCATCCAGGCTCAGTCGTCGACCTCTACCTCGGTGAAGGCTTCGCCGACGTGAAAGGCCCTGGC
CGCGCCGGCGCGCGCAGTCGAAGTCGCTCGCAGTGGGAGTCGCACGTCAGGAACCTGCTCCAGATCTGCAGGCCAA
CGCTGGAGGAGCTCAGGACCCCTGAGTTCGCCATCGTCGACGGCGTTCTGCTTCGCTCACCCCTCTCGAAGACGCT
TTCACTGGCAGCGCTCTCGTCTGCCGGTCGAGCCCAAATTCGCGGAGTTCAAAGAGATCGGTATCCGAGCGAAGT
GTTTCGCACTGAGATCCGCAAGTTCGAGGGCTGGTCTCTCGCGGAGATGGCAGAGACGGCAAGGACCCAGCTCCG
CCGCCTCTCTGCCGGCGCTCGAGTCAGGACCTCCAGGTCAGAACCTCACGGCGCTCAGGCGATAACAGCAGGGCCCTGCTGCG
AGCGTCACTGGCTCGGCCGCTGAGTCAGGAGATCCGAGCAGGACACCGCTTACAGGCGTCAAGGCGCTGCAAGGCC
CACGCTCGGGCCGGCGCAGCTGGTGTACGCCACATTCAACGAAAAGCTGTATCAGGCGTCAAGGCGTCAAGGCGT
CTCTGACCCGAGCCTGGTGTACGCCACATTCAACGAAAAGCTGTATCAGGCGTCAAGGCGTCAAGGCGT
CACGCCACTGGCAGAACGCCAACGGCTACGACGTGGTGCAGGCAAGGCACTCAAGCTGTGATCTGCCAACGCGTGGAGAGCGATGG
TTCTCGCGCCCTGACCCCGAGCCACTGCTGTTACTGGGACGACGGCCATGCGCAGAACGATCCGCGAA
AGGAGGCTCATCTGCTGCAGGACGACCAAGCTGCCAGTCCGGCAAAGCCTATGGAGATAA
```

Protein sequence: (SEQ ID NO: 180)

```
VSVNPIQAFVDFLYLGEFADVKLAGAGARRVEVPREWESHVQELLQICRQTLEELQDPEFAIVVDGVLLRVTLLEDA
FSGSVFVLRRSSAQLREFQEIGVPSEVSALMDPQLQGLVLVFCGEMATGKTSASAASLLRLQELGGVGCavedPQETNL
SGQHGLGRCIQVRTSRRSGYSEALLRTLAGADLVLIGEIRDEDTAYQACKASLTGSLVIATIHAKSCHQAIERLVTLA
QPLARNAYDVVAEGIQAQICQALESQDGSSRRLTAEPPLLFTGDDGPSMRDKIRRKEAHLLQDDQARQSRQSLWR.
```

RL080

DNA sequence: (SEQ ID NO: 59)

```
ATGAGCACTACGCAACGCACCTCCCGCAGCGAGGGCGTTTCGTTTCCATCGAGATGATCATCGTGTGATCATCAT
CGCCATCGGGGCTGGGCTGGGCCCTGGCGCAGCGCTGGAAATTCAGTTCTGCTCCAAACGCCAACGAGGAACAACGCAACA
TCAGCGTCATTGCGGCCAACGCACCGCCCTGAACACCTCTTCGCGCTACCGCTCCAGCGTACCAACCTGATCCCCAGC
CTGATCGCAATCAACGGCGTCCGAAGAACATGAGTGTCTCTCCGGCGTGTCTACACGCTTACGGCGATCGGTAC
TGTCTCGTCCACCGGCATGGGCTTCTCGATCACCACAGCAAGTTCGCCCCAGGACGCGCTGTATCACGCTGCCACCAAGA
TCGCGAAGAACACCTTCGAGCAGACCAAATCAACAGCGGATCTCGATCACGGAGAAGTGACCACCGCAGCCGCGACC
CAGGCGTGCAGCAGCGACAGCAACGATTACCTGGACCTATAGTCGTGA
```

Protein sequence: (SEQ ID NO: 181)

```
MSTTQRTSRPTQGGFVSIEMIIVLIIIAIGVGLLAAAAGMFSSSNANEEQRNISVIAANARALKTSSGYGSSGTNLIPS
LIAINGVPKNMSVSSGVVNVYGGSVTVSSTGMGSITTSKLPQDACITLATKIAKNTFEQTKINSGSSITGEVTAAAT
QACSSDSNSITWTYSS
```

RL081

DNA sequence: (SEQ ID NO: 60)

```
ATGGGGGCTCTGGGAGCAGTCGAGTCGCCCTACAGCAAGCAGTCGCCGCAAGAACGCCAGTTCTACGA
AAGCATGTCACCCCTGCTCGAAAACGGGCTCCGGTGAAGGATGCTGTGGCAAGGGTGCACAGATCTTCGCTCATGAGG
GGCAGCATCCGTTCTACCGGTCGACATGCCAGTCGCGAAGCGCTGATGGGCTGTCCAACGGCAAGCGCTGGCCACC
GCCATGGCGCTCATCTCCCCGCCAACGGCGAGCGTGTGATCGAGGGCGGAGATGAGCGCAACCTGGTTAGGCCAT
GGCGATGCCATCTCCCTGGCGAGGGCCAGGATCCGCCAACCATCGCAGGCCCTGCTCTACCCCTGCC
TGTCCGCATGATGGTGTCTGCTGTGATCGTCGCTATCGCATGGTCCCCAGCCTGGCAGGCTCTCGAACCGAGTC
ACCTGGACCGGCCGCTGCCACGCCATTGCCAGCTGTCACAGGACCTGGTATCTACGTTCTGGTCGCC
CATCACCTCATCGGGTGTCTACGTCAGTTGCCACCTACCGCTGGAAAGGCCGGTCTGGCTGGACCGGACGCTGC
CGCCCTGGTCCATCTACCGCATGCTCCAGGGCACCCCTTCGCTGAAACATGGCGTCTGCTCAACGCCGGCATACCC
CCCTACAGCAGCTGGCCAGCATGATCAAGATCTCCCGCCCTGGCTGAAGCGCAGGCTTGAAGCTGCCCGTACGGCGT
GGCGCTGGCCAGAACATTGGCTTGTGCCCTCGAGCGGGTCAAGATTTCCCGACCGCAGGCCATCCAGTACCTGT
GCATCTCGCCAACCGGGAGGCTCTCCGAGGGCGTGGTCAAGTTCAGCCCGCTGGCGAGGACGCCCTCAAGCAG
ATCGAGCTGGCCGCCGGCTGGTGAAGAACATTGCCCTGATCTTCATCGGCCGCTGATGATCCTGGTCTGCTGCC
CTACAGGACAGCAGCTCATCCAAATCATGAACCAACTGA
```

Protein sequence: (SEQ ID NO: 182)

```
MGGFWEQLQFAYSKQFGRKERLQFYESMSTLLENGVPLKDAVAEVHKIFAHEQHQPFPVIAASREALMGLSNGKRLAT
AMALYLPQERALIEAGEMSGNLVQAMGDAVSLEAQRIRATIWLQALLYPSALSAMMVFLLCIVAYRMPVSLARLSDPV
TWTGPLATLNIAASFTGPGIYVLVAVAVITLTVVVIVTLPYRWKGRVWLDRTPWPSIYRMLQGTTFLNMAVMLNAGIR
PYDSLASMISPPWLKQRLEAARYGVGLGQNLGVRSAGHDFPDRQAIQYLCI LANRGGFSEALVKFSRRWQETSLKQ
IELAAGLVKNFALIFIGALMILVLLGAYQAQQLIQSMNH.
```

**FIGURE 30J**

**RL082**

DNA sequence: (SEQ ID NO: 61)

ATGACGAACCTTCAGATTGCCGCGCTTGCAGCCCTCCATGGTACCCAAGTGCACCCGGACGGTGGTGAATGGGA  
GGTATCGAAGCAGTCAGGAAATCATGGCTCTGGCTGCCAGCGCAGCTATCTATCGGAGAGCCACCAGAACGACA  
TACACGTTCTGTCATGCGCTCGCATGCCGCTGGCTCCGATACCGCTAACCTCACCGACCTGCAGACCATT  
CACCAAGCTTACCGCGCGCTGCCATGGACGGCTGGCTCGATAGCGATGGCCAGCGCCGACCCAGATGCAGGAGCGGT  
GGTCAAGATCATTGTAAGGCCACTGAGCTGCCAGCTGACGTGCAATTCTGTCGAGTCCCAGGGCACCCGAGCA  
AGATCCGTTCCCGCTGACGGCTGCTGAAGACCCTGAGCAGTTCCAGGCCAGGGACTGCACGAACCTGTGCAACC  
ATCTACCAATCATGTGCGACGGCCAGCAGCTGTTCAAGCCGCAACTGGACCAAGCAGCGCGGATGAGCCAGACCTT  
CGTCAAGGAGCTCACCTGTCAGTGGCCGGATGCCACCCGGCCGCTGCCGGGGGTTCTGATGATCTGCGACTGC  
TCTACGACGACACCAGCCGCTGACAGCCGAGCTCGGCTACCTGCCCAGCAGAACGCACTGTTGATCGCATGATG  
CGTATGCCCTACGGCATCAACATCTGTCGGGCCACCGGGTCAGAAAGTCGATGACCTTGAAGGTACCCCTGGAAGG  
CCTCGACAAGCTCATGGCGATCAAGCACATCTGACCATCGAGGATCCGCCGAAATACCGCATTCGCCGGCAAGGCA  
TCAACCAAGACCCCCACTGGTCTACGACGCCAGGCCAACGCGCAAGGCCAGGGCTGGCCGGGCAATCGCCAACGGC  
ATGCGCCTGGATCCGGACTACATGATGATCGGCGAAGTACCGCAGCTTCGCGCTGCGCGTCCGTGGTGCAT  
GACCGGGCACGGCTATGGTCGACCCCTGACACCAAAGCGCGATCGGATTGTCAGCGCCTGAAGGACCTGGGCTG  
ACCCCGGCTTGCTGTCGATCGGGCCCTGTCGACCCGCGTGTCAACCAAGGCCGCTGCTGCCAAGCTCTGCCCAACTGC  
'AAAGTGCCTTCCAAGACCCAAGACCAACTCGGCCGACTTGGTCGACCGGCTGCCAGCCTTGACCGATGTTCCA  
-GGTCAEGTCAAGGGCCTGGCTGCCAGGGCTGGCTCGGGCTCAACGGGGCTGATCGTGCAGGAGGTGGTTC  
-TGGCCACCCCTGCTCATGCGTGTGTTGCAAGGGGCCAGCGGAGCACGCAACTACTGGGTCAAGACCATGCAAG  
GGCATCACCAAGCAGGCCACGCCATCCCGCGCATCAACGAGGGCATGTTGCAACCCGAGATGGTCGAGGATTTCATTG  
GCCACTCGACTTCGATGAGCATCTGTCGACGACAGCTTCACTCCAGGAGGCGTGTGA:

Protein sequence: (SEQ ID NO: 183)

MTNLQIAALAQPMSVTLTADGGEWEVSKHLQEIMALAADGTLYLSESHQNDIHLVLSFIDRLRRGFYQLNLTDLQTI  
HQLYRAVAMDGLVDSQGRATQMQERVVKIIKRATELRASTDVHFVSPAGTGSKIRFVDRGDLKTVFQFRSQUELHELCAT  
IYOSMCDVAEPLFKPQLDQDARMQSFTVEKLNLSARIATRPRAGGFLMILRLLYDGTGLSLEQLGYLPEQNALFDRM  
RMPYGINILSGPTGSKSMTLKVTLELDKLHGGSKHILTIEDPPEYRIRGEGINQTPLVYDATDPDAERQAWAAGIANG  
MRLLDPDYMIGEVRLDFAAVAAFRGAMTGHGLWSTLHTNSAIGIVQRLKDLGVPGLFPDALLTGLINQSLLPKLCPHC  
KVRFQDHQDQLAPDLVERVRLTDVSQVHVKGPGCQACRGSGVNRSRIVAEVVPLTLAFMRVFAKGGPAEARNYWWKTMQ  
GITKHAHAIIRRINEGMFDPMVDEDIFGPLDFDEHLLDDSFYSQEAC.

**RL083**

DNA sequence: (SEQ ID NO: 62)

ATGCGAACTGAGCCGATCGGCATGCCGTGGCCGTCTTCCCTCGCTGGCCAGGCCCTGCCTGGCACCGTTGG  
CGAACCTGGAGATCCAGGCCAGGCCATCCACCGAGGCAAGGTGCGCCTGCCACCGCGCAGCGCAATTGGAG  
GCAAAGGGAAACCGGCCAGGTGCTCAGGCCAGGGCAGAACCTCGCCATGCCGGTGCAGGCCGCGCAGATC  
ACCGCAGGGTTCCGCCAGTGGTGCAGGACATCTAGGCCGCCCCGGCAAGATGACTGCCACGTTCTTGTCCGGGG  
GTACGAGGTTGACGCCAGCGGGAGCTGCCAGGCAATACCGCGTGTGAGTCATCTCGCTGGACCGAGTCGTC  
TCACCGACAAGGACGCCAACCGCGTGGCGTGGCTCTCCACCGGTTGCCCAACGCCCTCTACGCCCAAGGC  
GCCCTGGTCCGCCGGCTGCCGGGCTGTACCGCAGCCGTTCACTCAGTAG

Protein sequence: (SEQ ID NO: 184)

MRTEPIGMAVAVLFLLASGQACAGTVGELAEIQAQAILTEAKVRLATAQRQLEGKGETQVVSAQGQTFAMPVPAAPPTI  
TQPVPVVRTIYAGGKMTATFLPFGYEVDAASGAELPGKYRVESISLDQVVLTDKDGNRVPVGSSVAPTQASSTAQG  
ASVPPALPGAVPQPFIQ.

**RL084**

DNA sequence: (SEQ ID NO: 63)

ATGGAGAAGCCTGACCTCGGCAGCCGTGGACCAGACGTCTCGATCTGAGCTACACCGCAACAAGTCTGCTAGCGGCCT  
GTTCTGGCGCCCTGTCCAGCCAGCGCAGTACATGAAGGAAGCGCGCAAGCTGGCAAGGAAGAGCATCTGGACATCG  
TTGCCATCCGCCATTACCGACGGTATCCAGGCCGCTTCGAACTGCAAGGCGAGTCAGGGATGTACTCC  
CTGGCCTCGCGCTTCAGGCCAGTCAGCCGACTTCCTGCCGTGCTGAAAGTCAGCCAGGACCGCTACCGCTGTT  
CGCACGCTGATGGCGGATGTCGCCAGGATCTGGTACCCACCTCGACGAGGCCGGGACCGGGTCAAGGAAG  
TCTCTACGCGCCGCGTGTGCGAAACCGCACAGGCTTCGCTGGGCAAGGGTTGATTTCCCGTCAAGGACTTCGACATC  
GAGGAACGCTCGGCCAGAGGCCCTGCCGCGACTACCGCCATCCGGCAACTCACCTCCGCTTGTCGCCAGGGAGTG  
GACCGCAGTGGCCTGCTGGTGTGGTAGGTGGCTGCTAACCGCTACTACCTATGGAATGCCACAGGAAGAC  
TCGCCAGGCAAGCCGCGCTCCCGAGGGAGCAGAGGCCCTGCCGAGCTGCCAGAGAACGCCACGCCAGGCC  
CTGGACCTGGCGTATTGCAAGCCTGGACGCTCATCTGACCTCGAGGACATGCTACCGCCCTGTAAGCAAGGCAAC  
GGGGTACTGTCGCTGTCATCCAGGGCTGGCTCTTCAATCCAGCAAGTGCAGCGCAGGGCTCTGGTCCCGACCTAC  
ACCGTACCGCAACAGCACAGCAGCCGACCTGACAGCGGCCAGCAGCACCTGTCGCCAGCCGCCCTCGTCATC  
GACAACCGCAACACCGCGGCCCTGAAGGTCATGTAAGGTTGCCATCGCAGTGTGAGCCGCTACTGCCGGCGACCA  
CGTCTGCAAGCCGCTGACGAGCCACCTGACCGTCAAGGGTCAAGGCCAAGCTGTCATGAGCCAGGACAACCTCCG  
CCCTCCCTGGCGCGGAAGCTGCACTGAAACAGCAAGTGTGTTGCCCTCTGGAAGAAATTCACTTCAAGCGCCCAGACC  
CGGCTCCCGCAGACCTGACCTTCAAGGGCTGCCGCTGCCGATCACCACCTCGAAACACCGCTCAAGGA  
CAGCCAGTTGAGCTGTCACAGGAGAAATCTATGCGAAGTGA

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
Applicants: Laurence Rahme et al.  
Filing Date: September 12, 2003 Serial No.: Not Yet Assigned  
Page 56 of 118 Customer No.: 21559

## FIGURE 30K

Protein sequence: (SEQ ID NO: 185)

MEKPDLGSRGPDVSILSYHGNKFKVSGLFWRPLSSQRQYMKEARKLGKEEHLDIVAIRHSPTVIQAGFVSKSQGAVKGMS  
LASALSGQFDGDFLACWKVDEDRYALVATLDGAIVPGQDLVTTLDDEARDRVRKLSTRGVLRNAQVFPEGFDFPVKDFDI  
EELLAPKRLRRDYRLRQLTFGLSAREWTAVALLGCVVGGSLTAYYLWNNAQELARQAALLEQRRLAELAEKNAQAKQP  
LDLTLASLQKPWTLIPDLEDMLRACKSAGTGVLSLSIQGWLFEKSKCDGRVLVATYHRTGNSTAADLTAAQSQHLFADRPAFVI  
DNGNTAALKVLDLKVAIGSDEPPLLPAADDVLQALTSHLYRQGVEPKLSISQETTPPLPGAEAATEQQVVLPSWKETFSAQT  
RLPADLTFQGLPAAGVRITNLETTLKDSDLWTVTGEIYAN.

RL085

DNA sequence: (SEQ ID NO: 64)

ATCGTGTGCGAAGCTACGGCAGATTCCCGCTTACGATCGCAGCGCAGGTGCGCAACACCCGACCGGATCGGCGCATAAC  
GGTGGTGTCTCCGACAAACCCCTGGGTAGCAGCAGAAACCCCTAACGCTTTCGACACCCCTGTCCAGTGACTGCATCGTGA  
CGTGGCCCTCGAGCGCAGCGTCGCTCGAGGAGGCCAGGAAGTCATCAACCAATGCCACATGGCGGTAGTATC  
ACGCCCGACGCGCTGAACCCGGCCCTTCGCGGTAGAACCTCAGCAGCGCCAGAACGCCCGCCATCCAAGG  
CGGCGAGGACATGCCACCATGCTGTTCTCTGCCTCGCAGCGCATGGCATGTCGCTGGCCGGAGCAGCATGGGT  
CGAGCTTCGGGTCTACGGCTCGGCTCTGGCGTACAACCCAACCGAGAAAAGGGTCGAGTTCTACTACCTGGACACTCGGACCTT  
CCGCATGTAACGCTTCGACGCTCAACAGGTGACTCCACCGTGTGTTCCGGTATGACGACGGCCGGCATCAGCG  
GGGACGGCTCCGGATCCACCGGACAGAAATGGCAGCTCCGGCATCGCGCAGACTCCGGCAGCAAGCAGACACCAGCTCG  
GAGCTGAAGACATGATCCTCAGCAGACATCGAGAACAGCATCAACTCGATGTCGACGCCAGCATGGGACGCATGTCGCT  
GTCCCGTGCACGGCACCCCTGACCGTACCGCAGCCGCTCAGAACCTCTAACCGTGTCCAGCAGTTGGTCACCCGAGAGA  
ACGAGAGCATACCAAGCAGGTGCTGCTAACGCTCAGGGTGTGCTGACGTCAGCTCGTCCGGCTGACGCCAGAACAGATCAACTGGGATC  
GACTGGAACCTGGTCTACAACTGCTCAACAAACAAAGTGGGGCATGGGCTGAAGAACACCATGCCGGCATCGATCAAAG  
CGCGATCTCCGGCTCGTGACATCTGGATACCGCAACAGGCCCTGGGAGGATCAAGGCCATGTCGACGGCCTGG  
CCCAGCAGGGCGCGTCTGACCGTCCGATCCCCGTCCGTGACCGCTAACCTCCAGTCGGCGCGATCCAGATCGGC  
CGCTACGACAGCTACCTGGCTCCAGCCAGATCTCAACAGTCGCCAGGTGGCAGTACCACTCGCTGATCCGGCGC  
CGTGACAGCGCTACAACATGAGGCTCTGGCTGATGAAAGCGGGAGATGCTGCTGAAGATCAACATCAACA  
TGACCTCCCAGGCGACGGTCAACATGAGGCGAGCTTCAAGCCAGTCCGGCTTCCGGACGACTACAAGTGTTC  
GACAGAAGGTACGCTCGCCAGCGAGACCTTGTACTCTGGCTTCCGGCTTCCGGACGACCCAGGAGCACCAACAGGT  
CGGACCCGGCGACGCTGGCTTCTCGGCTTCCGGCTTCCGGCGGGCTGACCCGCAATACCAAGGCCAGGGTACGTTGGCTGA  
TCACCCCGTGTGCTGGGCTGA

Protein sequence: (SEQ ID NO: 186)

IVCEATADSASTIAAQVRNTRPDRRTVVFSDKPVSTKPLSVSHTLSSDCIVTWRPAGAASLQEAAQEVINQCHMAVSI  
TPDALNPAAFAVQPQQRASNAPPQIQQGQDMATLFPASVANGMSLGAAGGSMSSFGSYGRPSLYNIKWNGKVSGFLDLI  
AARAGVSWRYNPTEKRVFYLDTRTFRMYAFDDVNTVDSTVRSGMTTAACISGDGSGSTGQNGSSGSGDGSKQTTSS  
ELKTSILSDIENSINSMLTPSMGRMSLSRATGTLTVTDRPEVILNRVQQLVNRENESITKQVLLNVNVLVALTDQQLGI  
DWNLVYKSLNNKKGIGLKNTPMPGIDQSAISGSVSIILDTANSAWAGSKAMVQALAQQGRVSTVRSPSFTTLLNLSAPIQIG  
RYDSYLAQQSISNVVAQVGSTTSIIPGAVTSGYNNMSLLPFVMESEGMLLKININMTSRPTFEMQTSGDSKAQFPSYDIQLF  
DQKVRLRSGETLVLSGFDQTTEDTNKVGTDAGFFGLGGGLTRNTKREVIVVLITPVVLG.

FIGURE 30L

RL086

DNA sequence: (SEQ ID NO: 65)

```
ATGACCAGGCAGTTGACCACTCTCACGCTGTGCCTGCTCGCCAGCTGCACGACCCACAAGGCTGAGCCGGCCAGGCC  
AGCCTTCGACAGCAGCCGAATCCAGACCTGCTTCTCCGGACCTGTATCCAAACGGTGTGAGCCGGAGAAAGAGCCCG  
TAGTGCCTATGGCGCTACACCCCTGGTCAGCACCCAGCCTGATGCCGCTCACCGCAGCTGATGCCAGATCATCGAC  
GTAACCATCCCGTCGAGCATGAACCCAGCGTCAGGACGCCATGCACTACGTGATGCCGCTCGGGTTACTCGCTGTG  
CCCGCAGACCCGGTCATGAAACATCTCTACACCCGGCCCTGCCGGCACTCGAGTACAAGCTCGCCCGATGACCC  
TCCGCAACACCCCTCAGGCTCTCCGGCCAGGGTTAAGGTCAGCAGGGTCCAGCAACTGTATGCGAAGCCGCTGCCAAC  
CTCGCCGGCGTAGCGCAACCCCTCTCACGGAGAAAGTCAGCACGCTGGAGTCGCCATCGTGGTCGCTCGGTGCCGA  
CACCGCGCCGATCACCAACAGCACCGCTCCGCCAAGAAGCTGAATCCAAACTGTGCTCCCGGCCAGCCGACCCGCC  
AAGGATGCCACCCCTCTCTCCCGGGCTTCCGGCACCGCAAGGCTCGGGCTCCGGCTGAAGTCCACGCCGCC  
CACTCCACCCGGCTGGCTCCGGCACCGTCAGGTGCTCACGGCCAGGCTCCGAGCTGGACCCGCTGCCACAGGCT  
GTCAGGGAGACGGGATCAACCCCTGGCGACACCTTGGAAAGCTTGGCAAGCGCGCACCTGGACCCGCTGGAG  
CCGAGGATCTCAACTATCCGATCGAGGCTCCACTGACCTTCAACGGCTCTCGAGGACGGGTATCGAGCTTCCC  
CCTGTATGACGCTGCCAACGGCCCTCTGGTGAACGCCAGGCCAGCTCCGTATCATCAAGGAGCGCAAGA  
ACTGA
```

Protein sequence: (SEQ ID NO: 187)

```
MTRQLTTLCLLLASCTTHKAEPARPAFDSSRNPDLLSPDLYPNGVQPEKEPVRYGRYTLVSTQPDAGQRLDMAQIID  
VTIPSSMNPSVKDAMQYVMSRSRGYSLCPADAGHVNLYTRPLPAAQYKLGPMTRNLQVLSGPWQVKVDEVARQVCFV  
LRPGYQLPPAPRPKPVQQLYAKPAAPTPPAVAQPSSTEKVSTLESPIVVASVPTPAPITTSHPAKKPESTTVLPPAAPA  
KDGHPSPPAASAPTKPAAASAVKSTPPPTVVASAPPVKVLTPPEPSRPLAQAWSAETGSTLRDTLEAWAKRARWTVRWE  
PQDLNYPIEAPLTFHGSFEDAVSELFPLYDAAERPFLVNASRPQSLIIKERKN.
```

RL087

DNA sequence: (SEQ ID NO: 66)

```
TTGAGCTTTAAATACTATGGGCTAAATTTCTGGGAGCTTCTTCTTTAGTCGCTTGGAAAGGCTCCGTATT  
TCCAAGCTGGCATCAAGTAAACCCCTGGTAGTGGCTGGATTCACTACTATCTGTTCTCGTAAGGCTTGTG  
AAGACTTCGCTTAAATATAACGGAAAAGACTCTGGTCACAGGTTTTCTCCGAAACCCCTGCAAAACAGGATTG  
CTCGAGTCTTTATTTGGCTTGTATTGTTCAATTCCCTGGGATGATTTTTATCTATAAAATACGGAAAGGC  
CTCGTAG
```

Protein sequence: (SEQ ID NO: 188)

```
LSFKYYWAKFFFVLAWSKGSVFPSSLASVNPLVVAGFSTILFPFSVRLVEDFALKYKEFWVTGFFSETPAKTGL  
YAVFYLACYLFSIPLGMIFLFYKYKGKAS.
```

RL088

DNA sequence: (SEQ ID NO: 67)

```
ATGTCCAATGACAACGAAGTACCTGGTCATGGTTATTGTCGACAAGGTCAGACGATCAACAGCATACGCTACGAGGTTCC  
CCCTATCGATAGCGCCGCGTGCAGGAATATGTTGGCAGTCATTGATTCAAAGAGACATATCTACAGAAAAACATT  
ATTATCAGTCGATCCATTGTTGAACAAGGAACAAAAGAAAAGAGGAGATCAACAAGAAAGTATCTGATCAAGTCGAT  
GGCTTGTAAAGCAGATCACTCAAGGAAAAGGGAGGCCACAAGGCAAGAGCAGTCATGTCGCGAGTCCTGCA  
CAAGATGGAATCTGATCTGAGGATAACAAAAGACCTTACCAAGGCCATTCAATTGACTACGAAAAGCAGTCAGCC  
TCTCCATCTATGAGGGCTGGTCAGATCTGGGAGAAAAGACTCTGGGAAGAAGAAAGAAGTACCCCTTTAGCAGCTT  
GTTAGAGATGAACTGGAGGGCGGTGCTACTACAAACAAAGATTCACTCTGTAAGCGTAAAGACAGGA  
GCTCAACAAAGAAAAGGCTAAAGGAAAAGAGGACCTCTCTCAACTGGAGGGACTACAAACCAAGAAAGGCCAATC  
TCGAGATGAAAGTACAATCGAGCTTGTATCAAGGGAAAGTGTCTTCATTGGTCAGTCACGCCAGAGCAATGG  
CTTGAACGTGCCACAAGACTGGTTACGCAAGCAATTGCTGATAAAAAGCAGCTGAGACACAAACAATCTTATCAA  
GAATGCCCAACCCCTCTAGAAAGCAGAAAGCCTACAAATGGTAGCTACTGTGGATGAGATAGCCAGTCTACAGA  
CCCGCTTAGATAAGCTGAAACGCCAACGACAGCAGCCAGGACAGAAGCAGAACGCCAGGGCCGAGGAACAGCGTTG  
CAAGATGCTTAAATTTACTGCCACTTTATAAGGAAGTAAGGAAATTGGCGCACGAACATCAAGAGATGGCGCA  
CCAAGTGGCGAAGGCCAGGGGAAAATATCAGGAGTTGGCGGAAGCAATCAATTGTTGAAAAACACAAGGATG  
CGTAAATAAAAAAACTTACGCTTAAAGATAGGCAAGGCCATTGCAAGCCTTGTATTCTAGACAAGCAGATGATGGCG  
AACAGCCTTGAGAAAATTAGCAAAGGCTTGGAGTTGAGGCAAGCTATTGACGCCAGCTGTACCAAGAGTTCAA  
GATATCTACGGAAACCGGGACTGGAAACCATTTTGTAAGGAAACACTAGCTGCTGGTGCAGGCCAGGGTACCGGG  
TTGTGGTATTGCAATTGCCACGCCAGGCCACTCTATAGGCATCCTGGTGCAGCTGGTAAATGGCAGTTACCGGG  
GCCATGATTGACGAAGGCCCTCTAGAAAAGCAAACCTGTAATGTCATTAA
```

## FIGURE 30M

Protein sequence: (SEQ ID NO:189)

MSNDNEPGSMIVVAQGPDDQYAYEVPPIDSAAVAGNMFGDLIQRDIYLQKNIYYPVRSIVEQGTKEKKEINKKVSQVD  
GLLKQITQGKREATRQERVDVMSAVLHKMESDLEGYKKTFTKGPFDYEQSSLISIYEAWVKIWEKNSWEERKKYPPQQL  
VRDELERAVAYYKQDSLSEAVKVLRQELNKQKALKEKEDLSQLERDYKTRKANLEMVKQSELDQAGSALPLVSPTEQW  
LERATRLVTQAIADKQLQTTNNTLIKNAPTPLEKQKAIYNGELLVDEIASLQTRLDKLNAETRRRTEAERKAAEEQAL  
QDAVKFTADFYKEVTEKFAGTSEMAHQLAEGARGKNIRSSAEAINSFEKHDKALNKKSLKDRQAIAKAFDSLQDMA  
KSLEKFSKGFVGVVGKAIDAASLYQEFKISTETGDWKPFVVKETLAAGAAASWLVGIAFATATATPIGILGFALVMAVTG  
AMIDEGLLEKANNLVMSI.

RL089

DNA sequence: SEQ ID NO: 68

ATGAACCGTCCACGCCCTGGTTAACGTACCTCCGGACACCTTCGACGCGGCTATCTCGACGGCTACGA  
CTTCGGCTTGAAGATCCCACATCGCAGGCAATCGCGCCTGCTGGAGCTGTCGGCTTCTTCATCGCGCCCGGG  
AGCATCCGGTGCACGGCTACTGGGGTCCCAAAGGCAAGCTGCTGCGACTGGACACTCTGTACAACCGTCTCGCC  
GAGCTAGCTGGAGGCCCTCACTCCAGTCTGGGGAGTTCACTCCCTTGGCTGAATCCGCAGGCCCTGCTTGACCC  
ACAGGCCTCACCTGGGGATGCTGCTGCATCGCGCCCTGGCGAGGGCGCGTCTACTGTCAGGCCAGTTCCATC  
CTGGTGTGTTGGCGGTGGCTGGCGGGATGCGCGGGTATTCCTGCGCCCATCGAGTTCTGGCGCATCGACACCACCTCC  
GAGCTGCTCGAAGCAACCTGATTCTGGAGCTTGGCTCGCCAGGAACATTCGAGATTGGATACTGTCAGGAGCT  
GCTCAGCGACCGCAGCTTGCAGCTGCGAGCTGCCAGCATGAGCATCGCGGTCACAGCAGGAACCGGCAGCGC  
CATCCCTGGAGGACGAGTCAGCCTCTGACATCTACCTCGCCGGTGGCGAGATCGAGCCACCGAGTACAGCTGGCT  
GATATCGAGGCCGCGCTCAGGGCTACTCTACTGGCCCACCGCTGACGCCATCGCTCATCTGTCAGAGAACAG  
CCGCTTATTGGCCGACGACATGGGATTGGCAAGACCCGCCAGGGCTCATCGCCGCTTCGATCCGCGCCGGCGAC  
CAATCTGGTCATCACCTGGCTACCTGCTGATCAATTGGCAGCGGAGATCCAGGAGGTCTATCCCTGGCCACCGTG  
GCCATCCAGCAGGACACCCAGAGGCGCAGTGGATCTCGTCAACTACGAGCAGTTGAGCCCTTCGTCGCCAACGCTTC  
GCCCTTCGCGCTGATGGTCATCGACGAGGCGCAGCGGATGAAGGAACCGCCGAATCACGCGCACCGGTTTCGACA  
TTGCCGCCAAGTGCCAACCGCTACCTGCTTACCGCAACGCCGTGCTCACCGCGAGACAGAGCTGCCACACCCCTGCTG  
CGCCTCTCAGGCCACCCCATGCCAACCTGCCGCTGAAGAGCTTCTGCGACCGCTTCGCGCCAAACCGGAGTTCCGCC  
GAGTCTCGGGCGGAGCTGGTGAECTGGATGCTGCGCAGGCCGAAAGATGCTGCTGCCACGCTCAAGGGCAAGCAGCGC  
AGTTGCTGAAGGTGGCCCTCTCCACCGAGGAACGCCAGCAATACGACGTGCTGCCCTCGAGGACCGACCGGCTTCGCG  
CGACTCGGCGCCTGCCGTTACCTGAAACGGTAAAGTTCGCGTGGCGATGGACCTGTTGAGCGAGCTGACGCGACA  
GGACAAGGTATCTGTTCTGCGAGTTCAAGCGACCGTGGCTGCCGTGAAGGAACCTGCGAGCAGGCCGACACGGCT  
GCGTCACGCTGGTGGCAATGACTGCTCACCAGCGCAGAAGGGATAGATCGCTCCAGGATCCGACTGCCGA  
GTGTTCATCTGCACTAGCGGCCGCGAGGGCAACACCTACTGCGCGAACTACGGTGTGTTCTGGCCCTGCC  
CTGGACTCCCGGTCAAGCAAGCGAAGACCCCGCGTACCGAACCGGAGCTCCGATGGTCGTTGAAAATCC  
CACTGGTCAGGCCACGATCGACGAGCAACTGTCACGCGAAACGCCAGGTGCCCAGGACCTCATCGAG  
CCCGAGCAGGTGACCGGAAACCGCCGCTTTAGCGCAAGCTAATGGATAA

Protein sequence: (SEQ ID NO: 190)

MNRPRLVNRTSATPSTLLQRAIFDGYDFGLKIPYIAGSNALLELSGFFISAREHPLHRYWRVPKGKLLPELDLTLNRLA  
ELAGGLHSQSREFSSLVESAQASLDRQAFTWGMLLRIAPlAEGVLLSGEFHPGVVAVARRMRGBFLRPSSWRIDTP  
ELLRSNLILELGLAEEQFEI LDVTQVELLSDGSFAPSTELPSMSIGPQQEPAAPSLEDESASDIYLAAPPEIERTEYSSA  
DIEAALQGYSSLLAHQPDGIAHLLQRTSALLADDMGLGKTRQAVIAASIRAGRPLVITLTLINWQREI QEVYPSATV  
AIQDTPAQLWILVNYEQLSPFVANASRFAVMVIDEAQRMKEPTAQCTRHFQDFIAAQVPNRYLLTGTGPVILNRETELHTLL  
RLSGHPIGQQLPLKEFCDRFAGNPEFRQSLRAELGDWMLRRRKDVLPSLKGKQRQLLKVALSTEERQQYDVLRLEDRPVFA  
RLGALRRLYLETVKVVRVAMDLLSELDAEDKVILFCEFKPTVAALKCEQAGHGCVTLVGNDSLTKRQKAIDRFQQDPDCR  
VFICTTAAAGTGNLTAANYVFFLGLPWTGQQEQAEDRAYRNGQLRMVVVKIPLVEATIDEQLWQLNAKRQVAQDLIE  
PEQVDGNRALLAASLTG.

**FIGURE 30N**

RL090

DNA sequence: (SEQ ID NO: 69)

GTGGCACCTCTGACACA CGCCCCCTAGCGGGCGCTACAGGATCCATCCCTGGCCGCTACAGCGAGCGGAGCTCGC  
CGTCGCCAACACCTGGCAACACATTCTCCCTCGCAGGACAGCTGAACCAAGTTCATCCGCACTACCTGCGCAGCA  
CATCTACGACCGAGTCTGGTGCATCACAGTCGCTGACAACCGTGTGCTTACACCATCATGCGTGAGGGCCGCTA  
CTCCAGGTATTGACCGCTAACATAA GTGCGTGGAGTGCAGACCTGCTTACATCGTATCCGGCAAGGCACGCCGCTCG  
AGCAGGGCCCTGAAGCTGCTACAGCCTTCAAAGTTCGACGCCAGGCTGACTCGTACTCAGCTCATACACAAGCGAG  
CGCACGACCTAGCCACACAGATGGCAGGGACGATCTGGACTTAACACATGCCCTGTGATTCGAGGCCACAGCAACAAG  
CGCTACTACGCGCAAGGCACAGTCTACTTGAAGCAGATCGAGCGGTCTTGCAGACAGGTCTGGACCA  
AGACCTGCTGTTGCCATCGCTCGTCTCGGCCAGCTACAACACTGGCTGGCTCAAGGCACCCAGGTGC  
GCCGGCTGCAATGCTGAAGGCTCAGCCGCTTGCAGCCGCTACTGGTGGATGCGAGGGAGTCTGGCTCACACCG  
ACGACCAACGCAACCGAGAGACATCCGCAATTACCTTCTGCCCTTCCCAGCTGAGCAGTGAACAGGCCAGGC  
CGCGCCATGCCATGCCATGGACTTGTACTCGATGATGGCCGCTTGCAGGCGACAGGAATTTCGGTCATCA  
ACTTTTCGCTCGTATTCAGCGCCGGCGCTCGTGAAGGCGACATTGGGATGGCATGCTCTCTACTGGCGGATCGTAGGTAACCGGGC  
GCTCTCTCCATCGAAACGGGAAGGCCGACATTGGGATGGCATGCTCTCTACTGGCGGATCGTAGGTAACCGGGC  
GCCGATCACTCGCGCTAATGGACAGCATTCTATGCCCTACAATGCGATCCCTGGCAAGTTCACAACGCCAACGGCC  
-ACTACAACCGTCTTCAACGGCTGCCGTCGGATTGGCAGGATCCGCATGGCTGCAATCAGTGCACGGCTGAGAGAC  
ATCAAGGAGTTCTATACCGCCCTCGACCGGGAACTCACAGGTTGTTGGCAGGGCGCAGGCCCTGAAAGCGTATCT  
GGGTATTGTACCTACCGACAAGCTGGCAACCTGGTGGAGACTACCAGGTCAGGGAGCTGGCTGGCAGTGC  
AGAGCAGCCTGCCGATCTGGTGCACACCGACAGTACACCCACTGGGAGGAAATGCTGTCGCTGGCTTATGATTGC  
CCTAATGGACTGCGAGATCGTGCAGCTCCGCTGCTCGGCCACCTATATGCCAACATATCGCTCTGGCATTGCA  
TAGCTACGACCAGGCCCTACCGAGGGAGACTGCCACTGCTCTCAGTACGTGAGGCTGGCTGTCGCTGCCCTGCC  
AATTGGAGCTCAGCGTGAGCATGGCGAGCCATTAGGTAGGCCCTGGAGTCCAACGACCTTCCACGGTGCAACTGCC  
GAATTCGATAATGCCCGCCGACCGACTCGCTGCCGGCAGGCAATCCGCTGGTCACTGGAACGAATTGCTCTGG  
AGCCATAGCGACGAACCTGAATGCCCGACATGACCGTCCACATGACCGCTTCGCCAATGGCGTGGAAAGCGGGCC  
TCGCCGAAGCCACGGCGAAGTGGCTGCTACTCAGTTGAAAGACCGATGA

Protein sequence: (SEQ ID NO: 191)

VAPLDNAPPSPGLQDPSLARYSERQLAVANTWATHFSLAGTARTKFIRHYLRSTSTTRWCITVAADNGVRYTMRAGPL  
LQVFDGQLIGAWECKPAHRI PASTPSRAGALKLQLRQFKDDAVAVLSSYTKRAHDLATQMRDDLGQHRLVYPHSNK  
RYVAPRQYFLKQIGAVLRTFRQVLDQDLLFAIRSVRCLSPQLYNWLQGDQVRRLQMLKAQPVLTPLLVDCEEGVWPHT  
TTNDNGESIRHYLPCFPQLDERSPQAAAMPQCDLYLDMGRILGQVADEGIVSINVFFAWLFQAPRASIRFLSHVSPGRAGG  
ALFRHKREGRHSWGHALLAASLGNRRPITRAQWTAFYAAYNAI PWQVHNAPKDPYRNLFNGCPSDWQDPAWLAITARLRD  
IKEFYTALDQGNSQVVRQARSALKAYLGHCTYRQAGNLVDDYHQVQRELRAAVQSSLPDLDVTD ETTWEGMLSVGLIDC  
PNGLQIVELRCPADLYAEHIALAHCIDSYDQAYRGDCRLLSVREAGRPLASAEELRREHGEPIGRPWSPKHLSTVQLR  
EFDNAPVPTDSPAGQAYRFMERIRSGAIATNLNPDMTVHMTRFANGRWKAGLAEATAKWLTLQEDR.

RL091

DNA sequence: (SEQ ID NO: 70)

ATGCAGAAAGAGAATATATCTGCCGAAATCACAGAGCGAGCTTTGATTTTTCTATTGGTCTCGCGATTTGAGTTCA  
CCTCAAAGAGAATGGCTACTTAAAAAATTACAAACCTGGAGCTAGGGCAGAGCCGGATGGAAAATTGGTACAAAACC  
ATTCTGACAAATACTCTCTTCCCATGCCACAGCACTAACGAGCAGTCCAGAGCAACAAATAGTCCCTGCCGGT  
AGAGAGCTGGGTTGGCGTCCGTTAATTAGATGAGGACAAAGCGACTTAGCTAGAGTCGCTCGCTTACTTAAGACCGT  
GCGAAACAATCTATTCACGGAGGCAGCATGGGGTGCACACTGGGACAACCCAGCGAGGACAATACATTTATTCTT  
TAAGTAAAGCTATCCTGACGAGTTGCTGCACTAGGAGACTTTGAGGCTGACTACAAGAGAATTTACTGA

Protein sequence: (SEQ ID NO: 192)

MRKENISAEITERAFDFFYWFSRFEFLKENCYLKNYKPGARAEPGWENFVQNHSDKYLSQSATALIEQSPEQQIVLPG  
RELGWRPVKLDDEKSDLARVARLLKTVRNNLFHGGKHGGANWDNPARTIHLILSKAILDEAALGDFEADYKRIY.

## FIGURE 30 O

RL092

DNA sequence: (SEQ ID NO: 71)

```
ATGCACATCGTAATCATTGAAGCCCCGGCAAGCTGAAAAAGCTGAGGTCCCTTCTCCCTCGATTCTGCCCCACGTGAC
CTGGCAGGTCGAGGCCACAGCCGCCACATCAGAGACCTACCGTTACGGGCAAGGACATCGCAGCTGCTCACCGTCGGCG
TGGGCGAGGATTTCAAAACCGCACTACCGAGTCTCGGCAAGGAAAAACCGTGGCACGGCTGAAGGAGCTGCGGCCAG
AAAGCCGTTGAAATCTACGTCGATCGGACCCGGATCGCAAGGCGAAAGCATTGGCTGGCACATCTCCAAGCTGCGCG
GATCAAGAACTACAAGCCGGTGGCTTCAAGAAAATCACAAGCTATGCATCACCGCCGAACCTAGCTCCCGCGTCGCC
TGGACCTCCCGAAGGTCGCTCGCAGGAATGCGCTCGCGTCATCGATGCCCTGGTGGGTATCTGGTCACGCCAGAGTTG
CGGCGCTGATGGTAGGGCCGACCCGCCGGCGCTGAGTCCGCTGGGTGTACCTGGTGGCTCGGAGAGCGGGGA
GATCCGCGCTTCAACGCAATCAAGCACTTCGGGGTGGAACTGACCTTCGTTCGCCAGCAGGGCGTACCTGGACGG
CGGAATGGGATCCAGTGGCTGTTGCCAGCAGGAGTTCCGTATGCCAGGATCGTCAACTCGCAGAAGCTGGTGGGG
GCTATACTGAAATGTCATCGTCGAGCTGATTGATAGCGAAGGAAACCGATGCGCTCCGGCACCGTTCATCTCCCTC
GCTCCAGATGGCCGGGAAATGCGCTGAAGTGGCTGACCGCCAGACGATGAAGGTGCGCCAGGGCTGTATGAACAGG
GGCTCATCACCTACCCGGAGCGAACACCCAAATATCTCGAAGGACTCGATGCCGATATCCGTCGCTCGCCAAAGCC
TTGGGCTGAAAGTGTGTTGAGAACAGCGGATGTTCAAACGGGACCAAGACGCCAGGAAGGCCACCCGCCATACCCCC
TACCGACTGGATGGCCGCTGCCGCCGTGAAACTGCTGATGAGCAGGGCGCTGTACCGCTCATTCGAGTCCGCGCGCTT
CCAGTCAGATCGAAGCTGCCGTGTCAGCAGTGAGAACCATCACCTCTGGCGCTGCCCGACAAAAAGCCGCTGCGC
TTGGCCCAAAGGGAGCTGTTGAGCAGCTGCTGGAGAAAAGCTGCTGAGGTGATGAGCCGAGGAGCAGAAGAA
CGAAACCCCTCAAACCCCATCCCGATCCCGCTGGAGCCACGCCAGATACTCAAGGTCTACAGCCGAGGTCTGG
AGAAGAAAACACCCCTCCAAGCGATTCAACGCCAGCTGGTGGCGAGATGAAGGCCGCGGGATTGGTGGCCA
TCCTCTACGCCCTGATCGTAAGAACATCATCGACAAGGCCAGGTGAGATGAAGGGCGAAGCTGATCCCCGGCA
GCTGGGAGGCCACCATCGCTCTGGAGCACAACTTCAGCTTCTCAGCTCGACTTCACCCCAACCTGAGGTG
CCTTGGACGGATGCCAACAGCGAGGACACCTACATGAACGTTCTCAGCAGTTCTACAGCTACTACAGACAGAGCTG
CAGACACTCCGCGCTCCCCAGGCCACAGGACGAAACCACCGCGAAGCTCCACCGCCAGTATCTCTGGCGCCGACCAAG
CGACTTCTTGCGGCAAGTGCCTGCTGCCCTGGTCAACCGCAAGAAAGCCGAAAGGCCGTTGACTTCTGGGTT
GCAGCGCTATCGAACACAGGGTCAAGGTTAGCTACCCCAACAGGCCGCCCTGACTTCGACAACCCCGGG
CTATAG
```

Protein sequence: (SEQ ID NO: 193)

```
MHIVIIEAPGKLKKLRSLLPSIRPDVTWQVEATAGHIRDLPVHGDPQMLTVGVGQDFKPHYQILSGKEKTVALKELRQ
KAVEIVYASDPDREGESIGWHILQAGIKNYKRVAFKEITKSCITAELSSPRRLDPKVASQECRRVIDRLVGYLVTPEL
RRVMGRPTTAGRVQSVAVYLVREREIRFTAIKHFGVELTVPSPSDGRTWTAEWDWPMVFASEEFPYVQDRQLAELVG
AIRNVIVETCIDSEETDAPPAPFISSSLQMAGNLKWSPDKTMVKVAQRLYEQGLITYHRTDPNISKDMPDPIRAVAKA
LGLKCVEQQRMFKAQDQAQEGHPAIRPTDWMAAAAGETADEQALYQLIRVRALASQIEAAVYAVRTITLLGVGPDKPLR
FGAKGKLLNVPGRKLLQGDDAEQKNETPSNPIPALEPRQILKVYSGEVLEKTTTPPKRFTDASLVGEMKRRGIGRP
SSYASIVNIIIDKGQVQMKGRSLIPEGELGEATIALLEHNFSLSLDFTRNLEVALDRIANSEDTYMNVQQFYQLLQTEL
QTLRALPSAQDEPRASSTASISSAPTSDFLCGKCGLPLVHRKAGKGGFDFWGCGSYRTGCKVSYPTKSGRPDFDNPRG
L.
```

RL093

DNA sequence: SEQ ID NO: 72

```
ATGGATCAAAGCCTTGCACATGCCAGCCAATCGCAACCCCAAGGAGCTGCCACTGTGCCACATGTTAGTCGG
TAGAACTTCCCGATAACATTGATCGCAGGCCACATTGGTGGCTATGACGCCAGGCCCTGGTGGCTGATGCCGATG
AGCCCGCACGGAGGAGCGAGGTGGCGCTCTGTTGGTCAAGGCTGGTGGTCACTACGCTGGTGGCGATAG
```

Protein sequence: (SEQ ID NO: 194)

```
MDQSLCTCMPTPIVNPKELRLCHMLVGRTPITLIAGDHWLSYDGSAWVDADEPATEDEVAALLVKAGGVTTWCW.
```

RL094

DNA sequence: SEQ ID NO: 73

```
GTGGCAAGGGCTTCCGAATCGGAAATCTCGACCAGTACGAGGTGAGTGTGTCAGGAGGCCGATACCGACAAGCT
GGACAGACGACACTTCACGATCCCAACCGGACTGTACGGCTATTGGTGGCTGAGGCCGCGGGAAAGGGCTACGGGTG
TCGACTGCCCTACACTCATCCTGCCATGCCGCTCTGGTAAAGGTTGCCCAGGAGCAGCAACAGCAGCTCGAC
TTCTGA
```

Protein sequence: (SEQ ID NO: 195)

```
VARASESEIISTSTRCSVSKRATDTKLDRRHFNDPHRTVRAIGAEAARKGLRVFDCPYSHPAMRASWLKGFAQEQQQLDF
```

**FIGURE 30P**

RL095

DNA sequence: (SEQ ID NO: 74)

ATGGCTACCCCGTCTTCTGGGAAGCCACATTGGCTCGGCCGGAGCACCGCAGCTTCCCAACGGCAACAATCCCC  
GCCGCAGTTCTGCAGACTAACGTGATGTCGACAACTCGATTCGGATGCCAAGCTGGCTACAGGATCGCGCGGGCT  
TCTGGTGCAGCGTCAATGGTGGCATCAGGATGCCAGCGCTTCGCCAAGTGTTCAGAAAGGTATGCGCGTCAAGGTC  
GAAGGCAGGGCATTATGGACCGCTGCCGGACAAAGAGTCAGCGAAGAAGTCCAGCGCTGAAGGTCGAAGCCTCGCG  
CATTTCCATCCTTCCGATCGCTGCCGGAGGTACCCCTGTTGCCAACCCAGCATCACAGTCTCGAACGACGCCAGC  
AACCTGCTCAGCAAGATGCCAACGCCAGGACTACGACAGCGCCTTCGACGACATCCCCATGTA

Protein sequence: (SEQ ID NO: 196)

MATPVFWEANIGSAPEHRSFPNGNNPRQLRLNVMFDNSIPDGQGGYKDRGGFWCSVEWWHQDAQRFAELFTKGMRVKV  
EGRAIMDRWPDKESGEVQALKVEASRISILPHRLAEVTLPTHQQSRNVPQQPAQQDAQSQQDYDSAFFDDIPM

RL096

DNA sequence (SEQ ID NO: 75)

ATGCCGCAGCTCGATAAGGACCAGCAAGGCCTCTGGAACAAAGTGCCTCCGCCACTGCAACAAACTGCCCTCAGGC  
GCTGCAACACAGTGCCTCACTAAAGGCCCTTTAAAGCTTAAAGGTAATAGGGACTGCCAGTTGGCGGAACAGT  
GCCAAGGCATGGAGCAGGATTGCTGAACTTGCCTGCCAGGGACTGCTGCCAGGTTCTGCCACCCCTCACTCTACTG  
CCCACCCGACTCATCGACAGCGCACATCCGCCAGCACACCTTCTCCGCTGCAGCACATTGCATCCCGCCGATGGG  
CGTGGGGTGTGGACGAAATGCTGCGCAGGACAAGACCCGGAATCTGCTGCAAGACCTCTACGAGATGGAGCTGC  
AGCGCATCACCCCAATCGAGATCACGCTGATCCACTCCATGCCAACGCCAGGCGCCAGTGCAGGAAAAGATGGGC  
CAGGCCAGGCCAGTTCATGGCCACTGCAGCACAGCACCAACCACACTGA

Protein sequence: (SEQ ID NO: 197)

MRQLDKDQOQALEQSAFRPLQQTAFQALQHSASLKGLLKPFKGNRQELAQLAEQCEAMEQGLLELAQGLLAQVRRPPFTLL  
PTRLIEQRTSARTTFLRWQHIAASRMGRVGVWTEMRLQDKTPPEYLLQDLYEMELQRTLNMQISLIHSIGKQAAECAEKMG  
QAAEAEFMGRLLQQSTNNH

RL097

DNA sequence: (SEQ ID NO: 76)

ATGGCTGAAACCCATCGGCTTCAGATCGGCTCTCCGCAGCGATGTCGCTCTGACGCTTACACCTATACGCCGCC  
CATCTGGACCGCCGGCAGAAGTCGGATGCCAACAGCACAGCATCTGCCCTCCGGCTCTGCGCATACGTGAATCGCA  
TGCACCGCGGGCAGCACAGGACGATCGTACTCCGACTGGTGCCTGGTTCAAGATCGAAGAGAAAGTCGAGAGCTGCCAA  
GCCGCACTCGAGGCCATCGACCAGCGACTGGATACGTCATGCCAACGCTGCCGCGACCCCTCGATATCTCCGAGAACCT  
GTCGTTACACCGGTCAGGCTCCGTTGTCATCTCAACCCCTCGGCCCTCAAGGCACTCTATCTCTGACCAACTACG  
ACGAACCTCGCCGTCGAATCTGCTGCCAGCACCTCGGGCTGTCGGCCCGCGACATGGAGGTCTGGCTCGACGAA  
GGTGCCTCGGTGTCGGCAAGCCTGTTGGCTGCCCCAGAGCTACCGTTCTGCCGCCACTCGCAGACTTCCGCC  
AAACATGCTCGCCGAAGCGCCGGAAAGATGACGAGAAGTACGAGATGCCAGGACATCTGGAGGGACTC  
GAGCTCGAACCTCGCTGCCGATCACCGGGCGCTCTGACGGTATGCCGATGACGCTGACCGTGTGCAACTC  
GAGGACTGA

Protein sequence: (SEQ ID NO: 198)

MAETHRLQIGSLRSDVALTLHTYHAAIRWTGRQKSDAKHSISLGLSGFCAYVNRMRHGAQDDPYSDDWLVQIEEKVESQ  
AALEAIQRLDDVMAKLPATLDISENLSVTPVKVPLFISNPLGFKAVALNTYDELARRILLAQHVGLVGRDMEVWLDE  
GASVLRSLFGLAQSYYQFSGATRDDFAANNARAEEARKMYEKFGIIPQDILEGTRRSNFAPPITGRSDGDADDDADRVEL  
ED

RL098

DNA sequence: (SEQ ID NO: 77)

ATGTTCTTGAGCATGCCCTTCTTTGGTCTGTTCTGCACTTTTACAGATCGTGAACGCCAGAG  
ACTCAGGCTGTTAATGCTGATCGTCTGGTATTCACTGAACTACCGTGTGACCATTACGGTGAGATGATCGCTTG  
AAATGCCGAAAAGCGATGTTGGAGCTTATGCAACAAAGCAACTACATGAACTGCCAACAGATTACCAACGGTAG

Protein sequence: (SEQ ID NO: 199)

MFLSMAPFFLVVLVLSALFTDAWDRELRLLLMLIVFGYSVTVLITVEMYRFEMAEKAMWGLCNKANYMNCQPDYQR.

RL099

DNA sequence: (SEQ ID NO: 78)

ATGAGAAAAGTCTCGGTGGCGCTGTTGGTGTGATCGGCCGCATCACTCTCCAGGTCTGACCTCCGCGCC  
CGGCAGCTGGTGATTCACTGAAATCACTCCACCGAGGCCACCTCCGCCGCCGGAGCTGGGTGATTCACTG  
GAATCACTCTGCCAGGGATCCACTCGGTATGCCGCAAGATGGTGTTCCGGCCGAAACACTTCGCCAACAGCAGGC  
ATCACCACTCACGAGGAACCAAACATGTTCTGA

**FIGURE 30Q**

Protein sequence: (SEQ ID NO:200)

MRKSRSGVFFGDAARITLPGPDLRAAGELGDSTGITPPGADLRAAGELGDSTGITLPGIHF GIGGKMGVSGRNTSPKRG  
ITTHEELKQCS.

FIGURE

RL100

DNA sequence (SEQ ID NO: 79)

ATGAGGCTGTCGCGCTTCCATTGACACTCTGGACTCGGCCCTCGGGCATCTGAGGCCATTGTATAAGAAGCG  
GCTTGCCTCGAAAGCGGAACCGCTGGCTCAACAAATTCCGCATCATTTCAGCGCAATCCTCATGAAACCGTT  
CACGGCGCTCCTCTGGATAAGCGCTTACTCCGCTGGAGCGAACTGCTGGCAAGTTCGCTCATCAACGAC  
GACGGACTGACCGCTTCCGACATCGAGCACTGCGCCCTATCTCGTATGCAAGCGGGCAAGATGCCCTCGCGGA  
AACCATGCCAAGGCACTACGGCTTCGCTGACCCGCTGGCTAGCCTCGCCGACGCCCTGCCAACGACCTCAAC  
GACAGGCTCAGGGCAACGTTACATCCTCACGAGCCTGCTCTCAGCGGAAGCCTGGAGCTGGACACCGACTAC  
ATGCAGTGGCTGAGCCAATCCACCGCTACGGCAACCGAGCATCGCAGATCTGGCAGATCATCTGGGGAGTTCA  
GGATGATCCGGACGTGGCTGGCCCTCCATCCATCTGGAGAGCTCGGAGGGCCTGAAACCCACAGCAATGGGCTA  
TCGATAGTCAGCTGAAGCGGATCCAGCGGAGAGCTGGCATCCGAATCTGCGATTACCTCATTCCACCCCGAGT  
TCGGATGCCAAGCTGAAATCACGGCAAGCAATGCCCTGAGCTGACCCGATACCGTCAAGGGCAACTGGCAG  
GCCGACTACGCCCTGGCTGGATGCCAAGCTCATATAGTAGCTATACATACAAACAGATTGTATGAAAAAGCCAG  
TACAACCGCGAGCACCGGAGGAAGCCCACCGAACCTGGCAGGATCTCGCAGCCTGCACTGGAGGGCAGCAACGGATCCAG  
GCAGTAAGCGCCTCAAGCGGATCTCGAGGATCTCGGCTACCCATCATCGAGCAGTGGCAGCACCGTTGCGGGCG  
AACAGTCAGCAATCCCTCGGCTACCTCATGAGCCTCATCCAGCGTGCAGTCAGGGCAAGTCAACGCTTCTGGCTC  
CGGAAGAACCGGCTGAGCGAACCATCCCGCAACCGAACGCCATTCTGCTCCGGCACCATCAAGCCCATAAGGCC  
ACACAGCCTCAGGTCCAGCCCCGGGAGTACCCGGACAGGGAGCGAGGTCTCAGCCGCTCAAGGACCTCATTGGCC  
CAGGCACGGATCGAGCGTCCATCCAGCGGGTGTGATGATTGATGA

Protein sequence: (SEQ ID NO: 201)

MRLSRFFP1STLLDSASGHLEAHYKKRLAAESGEPLAQYSGI1FSGNPHEVPRRLLLDKRLTPLERNCWQVFRLLIND  
DGLTAFFTYEQLRPYLGMPGK1ASRETIAKALTVRLRTRWLSLGRRRLNDLNGQVGNVY1LHDEPVSPAEALELDTDY  
MQLLSQSTGHGNRAIREIGQI1WREFRDDPVGRRLPHTLEKLEGRNLNQQWAIDSQLEADPAAEFGIRTLSDLPHSTPS  
SDAELSEISGKQCALPSSDTEPRQNPSTPLVRMPNSYSTYKQDSVCKKPVQPRAREEAHPNWQDLLHALEAEQRIQ  
AVSALRVSEDLRLPI1EQWQHRCAGGTVSNPFGYLMTL1QRAVQGKFNASWAPPEPAERTIPATERPIRAPAPSSPIAP  
TQPQVQPRGDTRTGSEVLSRLKDLIRPRHSSVPSERGDDs.

RL101

DNA sequence: (SEQ ID NO: 80)

ATGTCGAAGTCGACCATCAATGAAGCGGCTCTGACGCAAGGTGCTCAACCACCTGCGCAACGCCAGCTCAGGCCGGTGC  
CGAGATGGGGCTCGGGCCGGAGATTCTGGCTCAGCTCAACAGCCTGCCATGAGCATCTGACCAATACCCGGTT  
CCTGGTAGATGTCAGAGTGAACATCGACGTATGGAGAAAATCTGCCACAGCGAGCGCAGCGCAGGAAGACCTG  
CAGATCGAACGCGCACTGAAGCTGGAGGCCACCAACGATGATCCAGAGCTTCTGGCTGTCGCCAGGGACACCGC  
CACCAAGCGCTGATGTCAGGAGATCACCCGCCGCGGGCTGGCGCAGCTGATGAAACAGATCGAGCGCCAGATAT  
GGTCCCGCTGGAGCACCTGATGCGAGAAAATCAGGTCCGCTTGAAGAGCAGCTGGAGTTGCTGGACATCGCGATGATC  
CTCACAGAGAAAATCAAGCGGAATCGAACAGACTGAGGAAATTCATCGCCTGCCATTGTTGGTCTCTCATCCA  
GAGCTGGTGAAGACGGGCTCTATCCGTGCAATGAGCCAGAGCCAGGGCTGCAAAGTCCAATCCACTC  
TTTACCTCGTAGCGTCAGCTCACACCTGCCCATCGCAACACGCAAGGTGAACGCTGAGACAGAACG  
CAACAACACTGAACTGGTTCACTGGAGGCACACAGCACCATGA

Protein sequence: (SEQ ID NO: 202)

MSKSTINEAVLTQVLNHLRNGQIIRRCAEMGLRPEILAQLQQPAMSI LTNTPVSWDVVRVNIDVMEKILATAERSAQEDL  
QIERALKLGATTMIQSFFGLSPEDTATKRLMLEIHPRRGRWRQLDEQIERQIWFRWEHLMQENQVRLEDSMELLDJAMI  
LTEEINAGIEQDSPEFISLAIWWSLIQSWLKDGLYPSGKSSQAGLQKSQSTLYLASVSSHLPHSAPSATTQVNAETER  
QQLLNLVQSEGDTAP.

**FIGURE 30R**

**RL102**

DNA sequence: (SEQ ID NO: 81)

```
ATGAGTATGCCAAGATCACCCGCAAGATCTGAAAGACCGGCTACTGCCCTGGTTTACCGCACCGCCAAAGGTTCT
GGAGCAGTTGTCGACCCGATCAGCGACACGCCATGAGGCTGACACTCCACGACGTCCTCCCTGGCACGATAACCCCC
GGACCACTCGAAACCGGAAATACGATGAGCTGAAAGAATCGATCCGACATCGAGGCCCTCGATACGCGCCACCGAGTACT
CGACGGCCTGGAGACGGACAATACCGCATTGCAACGGGAAACACTCGCTGGAAATTCTCAACGACCTCTACAAAGA
GACGGGAGACGAGCGCTATTTCAGCTCGACTGCTGTTCAAGGCCCTGGGACAAGCAGCGGGCGAAATCATCGCGCTGA
CGGTCAATTGGCGAGAACGATCTGAAGGGCACCTCAAGTTCATCGAGGCCGGTTGGGTGCAAGGGCGAAATTCT
CTTACGAACAAGAGAACGGCGTGAAGCATTCCAGCGGACTTGGCACCTCGGCTAAAGCGGACGGCTACCCCTG
ATCTCAATCCCATATCAGTAAGATTTAGACACTATTGAGGTATTGGCGCCCGATTCCTGTATGCTGATGCTGATTACGGG
TCGGTAACCGCAAATCGAGAAACTCTGTCACTCGAAAGCTGGCATCCTCTGCTGGGACGTATACGCTGGTGA
GGGTTGACTTCGAATGCTGTTCAAGGACACCCCTGCAATCTTCAGCAGTAGCCCTGACGAAATTCAATTTCGAGCGTT
CCAGGACGAACTCATCGAAACAAATGAAGCGCCCTGGGCGTGGTTATGACCAAATCTGCTCGAGATTACCAACGGGC
AGCAGGAGCAACGGCGCCACTCTGGTGCAGCTGCCACACTCGCAGGCCACCTCAACTCCACCAATTGGGCGAGGAA
AACCTGCTGCGTCGCTACTGGACAAGCAACAAACAGAGGCCCGCGCAGATCCCAAAGTCCAGGACAAGGAGCAA
CCCGGTAAATCCCCTCCCCCGCCGCTCGCCACACCTGTTCAACAAACAAATGCCCCATGAGGAGCGTGCAGGGG
TCTTGGCAGGCCATATCGTGAAGCCGGTATCGACTAAGATCCAGCAGACTGCCAACGGCTGGCGGCTCGAGGGGAA
CATCTACCTGCTTCGATGAAAAGCCTGCACTCGAGCAATCCAGTGCAGTGGCTGCACCCGATEACCGATCTCTG
GTACATCGAGGGTCATCGATACCCCGAGATCTCGCAGGACATCGCTGATCTGGCTGAAGAGATCGCTCTGCAATG
TCGGCGCCCGAGCGAGATCGTCAGGATTAGGGCGGTGTTACACGTATCGCAGGCCAAATGAAGACCATGAGGATT
ACTGATTCAGCGCTGCACTCATGAGCTGCTCAAGCGTCAGGGCAGGTCAAGTCCAGGCTCTGCTGAGTGGCCAAACCCACAA
GTGACAAGCCATCTGCCAGGCAGGCCGCTCAATGACGAAGCCCTGGTGAAGTGTCCGATTCATTCCGCTTGGCCG
GCCTGGTTGACCTTGAGCTGCCGGCGCCTCCAGCAAGCAGTACTGACCGTGA
```

Protein sequence: (SEQ ID NO: 203)

```
MSMAKINPQDLKDRLAPGFTAPPKVLEQLSDPISDTPMRLTLHDVLPWHDNPRTRNPKYDELKESIRHGLDTPPPVT
RRPGEDKYRIRNGNTRLEI LDLYKETGDERYFSFDLKFPKWDKQRGEI IALTGHLAENDLKGDLKFIERAVGVQKAKF
LYEQENGGESI SQRERLARLKDGYPVQSOSHISKMLDTIEVLAAPAI PVMLYSGLGKPKQIEKLSSLRKSASSCWARLYAGE
GVDFEMLFQDTLAI FDSSPDEFIFERFQDELI DQMKRPLGLRYDQILLEITNGQQEQRRTLVDLPTPAAPPQLPPIGQE
NPAASSTGQAQTQSPAADPQTSRTSRSPNPGNPLPPPAPPVVQPKLPDDEERAALVLAGHIVSPVSTKIQQTRQRLAGLEI
HLPVFDETAQAI PVQVGLHPITDLWYIERSIDTPEILRQHIAADLAEEIALHVGAPGEIVRIQGGVGTYREPNEDEI
TDSALHLMTLLQAVSGQVQVVLNTHDQQTCDALGEFQFSAGLAQLLLGPPTSDKPSCQAGRLNDEALVLFRIIRLAR
RLVDLELPPAASEQATDQ.
```

**RL103**

DNA sequence: (SEQ ID NO: 82)

```
ATGACCATGGCCGAGAAACCGAAGATAAGTTGTTGCCGTATGCCCTGGCTTGCAGCTAACGCTAAAGCAAAAGC
CGCGATAACCACCGTTGCCAACAGCGAGATCGTCTACCGACTGGAGCGCACACGCCCTGAAGAACAGACTCGCG
GAGCAAACCGAATGGTCGACGAACCTCTCGCCAAGAACAGGCCCTGCAGGCTGAGCTGGCGCGGAACACGCCCTAG
GTGGCGAGGCATGA
```

Protein sequence: (SEQ ID NO: 204)

```
MTMARETEDKFVVRMPLGLRDLQKQKAADNHRSAANSEIVYRLERSNALEELARANRMVDELFAKNQRLQAEELAAANTPQ
VAEA
```

**RL104**

DNA sequence: (SEQ ID NO: 83)

```
ATGCCTATCAAACACGCCATCGTCCACCTGATCGAGAAGAACGCCGACGGCACCCGGCCGTCTCCACGCCGCGACGC
CGAGCTGGCGACTCCCAGGCCATCGAGAACCTGCTGCCACCTCAACGAAAGCTACACGCCAAGAACAGCCTGGG
GCTTCTCCAGGGCGAGTCCGGGCTACCGTCAGCGCTGGCTGGCGAGTACCTGGAGGGCACCGCAGCTTCGTC
GGCTTCAGCGCGAAGCGGTGAGCACCTGCAAAAGCTGATGGAGGAGTCAATCTTCACCGGCGGCCACGTCTGGT
CGCCCACTACCAAGCAAGGCATGACCGACTACCTGGCGATCGCCCTGCTGCACCCAGCGAAGGCGTGGCGGTGAACGAGT
CGCTGGAGGTACCCCGTCGCCACCTGGACCTCGGAGCTTGACCTGGCGCGGATCAACATTTCCGAATGGCGC
AACAAACAGCAGTCGAAGCAGTACATCTGTTCATCAAGGGCAAGGGCGGGAGGAAGGTCTCCGACTATTTCCGCACTT
CATCGGCTGCCAGGAAGGGTGGATTGCGGCCAGAGACCCGACCTGCTGAAGCCTTCAGCGATTTCGTGAAAGCG
AGGACATGGCCAGGAACAGGCCCGCAGAGAACCGAGACGCTGGTCAGTACGCCACCTCGCAGGCCGCGATCGCGAG
CCGATGACCCCTGACCGCCTTCGGAACCTGATGGACGACCGAGCAACCCGGGGCGTCTACGACTACATCCGAAACAGGA
CTACGGCCTGTCGCCGAAATCCCGCGACAAGCGCACCTCAACCAGTTCGCCGCTTACCGGCCGCGCAAGGCC
TGTCGATCAGCTTGAGGCGCACCTGCTGGCTCCAGGATCGAGTACGACGAGGAGCGCACCGCTGAGTACGAGC
CTCCCCACTCAACTCCCGCACCGCTCAAGCGGCCAAAGGCCAAATTGGAGAATGA
```

**FIGURE 30S**

Protein sequence: (SEQ ID NO: 205)

MPIKHAIVHLIEKKPDGTPAVLHARDAAELGDSQAIENLLADLINESYNAKNKAWGFFQGESGAYPFSWLGEYLEGDRDFV  
GFSREAVEHLQKLMEEESNLFTGGHVLFAHYQQGMDYLAIALLHHSEGVAEVNESLEVTPSRHLDLGQLHLARINISEWR  
NNKOSKQYISFIKGKGRKVSDYFRDFIGCQEGVDPSETRTLLKAFSDFVSEEDMAEEQAREKTETLVDYATSQARIGE  
PMTLDALSELMDDQQPRAFYDYIRNKDYGLSPEIPADKRTLNFRRFTGRAEGLSISFEAHLLGSRIEYDEERDTLQISS  
LPTQLRDQLKRRKAQIGE.

**RL105**

DNA sequence: (SEQ ID NO: 84)

ATGCGTAGTTCTTCGGCGCCGGAAAGCGTCGCGCTGGTGGCCTCGCTCAAGCAGAAGGCTGGAGCGTCGA  
CCGCTCCGAGCGGCCACTTGAAGCTCAGCAAGATCGGCTGCCCTCGATCTTCATTCTCACGCCAACGCGACGCAC  
CGCCGAGCTCAATGCCCGGCCCTCGCTCCGAGCCGACAGCAGCGTCCCTGAACCAGGAGTCTTCTGA

Protein sequence: (SEQ ID NO: 206)

MRSFLRGARESVRRLVAFQAEGWSVDRSAGGHILKLSKIGCASIFISSTPSDARGELNARALLRRADRQRSLNQESF

**RL106**

DNA Sequence: (SEQ ID NO: 85)

ATGCCGTACGTCACAGCCTACCGGCCGCTCGAGCACTTCCAGAAAGTCGAGCTGATGCTTGAGCTCAAGTTGGCTGAAGG  
TCCTTCGTTGATCTGCTGAAGTCTGGCTATCACCTGGATGGCAGCGGCCACAGCCCTGCCCTGACTGCGAAAGTCGC  
GCTACTGGACCAGCGGTTGGAGTGTAGGTGCTGCCATCGCTTCGGCAGCAAGGGAAAGTGCGAAAACGCCCTCAGG  
ACACGGTCGCGGTACACCTGTCGCGTCAACGGCACAGTAGCAACTGACGACCTATGCACTCACTGCGCACAGGGTCCG  
CATGCTGCGTTCCGGCATGACGACCTGGCCTGAGCCGGCAGAGCGATCGCAGCCCTCAGGGCTGGTGAACGTC  
TCCTGGATGCCGCCACCGATAGCCTCCCGCTTGCAGAGATGGAGACCTGGCTGCAGCTCACGCGAGGAG  
ACCACGAATGCGTAG

Protein sequence: (SEQ ID NO: 207)

MPDVTAYRPLEHFQKVELMLEKLREGPSWICLNCGYHLDGSGAQPCPDCGKSRWYWTSGWSVGRHRFSAAEEWENRLR  
TRSRSRVASTAPVATDDVCTQLRTEVRMLSAHDDLACSRQSDRRSLQALVKRLDAAATDSLPRSLAEMETWLQLNSEE  
TTNA.

**RL107**

DNA sequence: (SEQ ID NO: 86)

ATGAAGGGCGTCCCAGACCTATCAGTCATCGTCAGTTGATGGCGCCGGTTCTGGACCAATACCAATTCAAAGCAGCG  
TGGCACCTGCACCTGGAGCGACAAGGTGGCAGCCTCCCGCCTTGCAGACGACTGTTGGCAGGACAACGCATACATCA  
CCCGTATGCCGTACAGGCAGGGACCACAGAAAGCGCATCGAGAGGCCGCTGGCGCTGTCCTGTAGAAATCCAAGGAG  
TAGCGCGCATGCCGA

Protein sequence (SEQ ID NO: 208)

MKASQTYQCIVKFDGAGFWNTIQKQRATCTWSDKVAASRLAERLFGEDNAYITRMPVQAGDHEKRIESRWALSCRNPKE  
VARDA

**RL108**

DNA sequence: (SEQ ID NO: 87)

ATGAAACACTGAAGCCCCGTTCCGAGTATCCACGCCCTGGCGCGTTACCGACTCGGCACTGGTTCATGCCAATCACGT  
TGGGGTCAACCCCATCGAGCTGGACGCCCTCAGCCAAGTGTCTCGGCCCTCGCGGGACAGAGCACGGTCGCACCCA  
GTTCGATGGAGCGAGAGCTTCGTGAGCTGGAGGAACCTGGGTACATCGAAATCTGACCACCCAGGCCGGACTCTGGTG  
GTCACACTCGCCGCTCCGGGCAATTGCTTCCGCTTACTCTGCTGGTATGGATCCCGCAGACCCCTGTCAGCTGCTC  
GCTGAAAGTGAGCCTGGTGCCTGACTCAGGACTCCGACACCTCACCCGCTGTCCTGTAGAAATGCCGAG  
GCAGCAAGGACGCCGCCGAGTTCCCTGCATCAGTTGGCAACAACATATCCGGCATGAGCCGGAGTTGCCGAACCTG  
GTGCCGTTCAAGGTGCGTATGCACCTCAGCAAGGAGGCCGAGTCATGA

Protein sequence: (SEQ ID NO: 209)

MNTEARFPSIHASAAFTDSAVVHANHGVNPIELDALSQVISRLSDESTVAPSSMERELRELEELGYIEISTTQAGTLV  
VTTRAPGQLLSAYFWSVWIPRHLFSCSLKVSLVPHLCGTDQSQHLTAVFRIAGSKDAAREFLHQLANNYPGHEPELPEL  
VAVQVGDALSKEAES.

**FIGURE 30T**

RL109

DNA sequence: (SEQ ID NO: 88)

GTTCTGCAGATCAGCCGGAGGACTCGAAGTGAGTGTCTGGAACCTACGCCGCCACTCCCTCGAGGCGGAGCAAGG  
GGTACTCGCGGCCCTGATGCTGGACAACCGGGCATGGGACATTGTCGGCGATCAGTTGCAAGAAGGAGACTTCTCCGGC  
ATGAGCATCGGCTGATCTCACCGCCATCAGCGAGTTGCCCGAAGGATGCTCCGTTGATGTCGTACTGTCGGAA  
GCGATCGAAGACCTTCAGAAGTGGCGGCTGCCATCCTCGGCGACTCGCCGACAACACGCCCTCCGTGGCCAATAT  
CGAGGCTTACCGCAGATCGTCGGATCGGGCACACCTGCGCAGCTGATGTCCTCTCGGCGACCCTGCACCAAGGACCG  
CCTCGAACACCGGAAATCCCTCGAGGTTCAAGGGAGATGAGCAGAAGCTGTCGGCCCTTGGCAGGACCAACCA  
CAACGCCGATTCGTCGATATCAACAAGAGTCTCAAGAAGATCGCAGACACCCTGATTACCGCTTCAACAACAGTGA  
CGGTAACGGGGTCCCCACTGGCTCAAGGATCTGACACTCACCGCGGACTACAGAAGTGGATCTCATCATCGTC  
GGTGGCCGCCCGCGATGGGAAACAGTCGTTGCCCTCAACCTGTCGACACCGCGCTCACAGCGACCAACAGAAGTC  
TGGTCAGGTACAGCATGGAGATGCCCGCAGAGCAGTTGCTTCAGGCTTGGCCCTGTTGGCACCTGGACCTGG  
GCAAGCTGATGAAGGCCAACTGCAAGAAGAGGATTGGCCCAACTGTCGCGCATAACGACTATGGC  
AGCCGGCTGGTCATCAACGATCAGGCCAACCTCACCCGACAGACTGCGCCCAAGGTTGCGCGGCCAGGAAGTA  
CGGACACCCCGCGCTGATATTGGTCGACTACCTGCAACTGTCGAGTGGCTGGCCACGGAGATCTGAGCCACCGAGATCT  
CGGAAATCTCCCGCTGCTGAAAGCGCTGGCCAAGGAGATGGACTGTCGGCTGAGTCTCATCCCAGCTAAATCGCGGC  
CTAGAGAACCGGACCGAACAGCAGCGAACACTGCCGACACTACAGAGAGCGGCCAATCGACAGGACGCCAGTGT  
CATGTTCTGTACCGCAGCAGGGCTACCAACCCCCAACACCGAGGCCAAGGGCATGCCAAATCATCGGCAAGTATC  
GCAACGGTCCGATGCCACCGTCCACCCGCCCTCATGCCAACAGACCCCTTGGCACCTGGCGCCGGGACCTGG  
CAA

RL110

DNA sequence: (SEQ ID NO: 89)

ATGACTCGCTGCTCTCGACCATCGCCTACGAGGCCCTGGTGCCTGCCGCCGAAATTCAAGCAACCGAGAGGAGCG  
CTGCATCGCGAACCTGGACCGGCAACAGGAACCTGGTCTGCTGCCCTGATCCGGATATGCCGAACGAGGTCTGG  
CAGCCAGGTTGAAACAAAACGCTCCAGCAGATCTGCTCCAGGGCTATGGCTGGGCTGAAAAAAAGCCCTGAGTTCTCC  
AAGAAGATCCGGCAGGACTGGGCGCGCAACTCGGTTCAAGAAGGGAAACACCCCATGGAACCTGCCGATGAAGGGGCT  
GCCCGCGGAGGACGCCAACAGAACGCAAGTTCAAGAAGGGAAAAGCCCCACACATGGCTCCAGTCGGCAGCACCG  
GGGTCAGCGCTGATGGCTACCTGCAACGAAAGATCTGGATACCGGCTATCCCCCGGGACTGGAAAGGCATCCACATC  
CTGCTTGGGAAGAACACTTCGGCCCCATCCAAACGGCCATTGCGCTGCTCAAGGACAACAAGCAGAACGCT  
CATGACAACCTGGAGCTCATACCCGGGCCACGCACTGCCGCAACTCCATCATGCTATCCACCTGAGCTGAAGA  
GCGCAATCCCGCTCATCAGCAAGCTAAACGCAACATTAGGAGTCGAGCATGAAGAACAAAGATTGA

Protein sequence: (SEQ ID NO: 210)

MTRSLSTIAYEALVRARRKFSNREERCIREWTAEQELVLLRYPDMPNEVLAARLNKTLQQICSRAYRLGLKKSPEFS  
KKIRQDWGSATRFKKGNTPWNCGMKGLPARGRAPETQFKKGQPKHTWLPVGSTRVSADGYIQRKISDTGYPPRDWKGIHI  
LLWEEHFGPPIPTGHCVCVCFKDNNQNVV1DNL1TRAERMRRNSIHYRPPPELKSAIRVISKLKRTIQEVEHEEQD

RL111

DNA sequence: (SEQ ID NO: 90)

ATGGACAAGCAAAAGTCCTCGCAAGGTCGAGAAGCTGATGCCCTGGCGAATGCCAAGGGGCCACGCCAACGAGGC  
GGAAACCGCATTGCCAAGGCCGATCCTGAAAGCGCAGTTCGACCTCAGCGATGCCGAGATCTGCCACACGGTGG  
AAACCGCGTGGCTTCCCACTCGAACCAGGCCGCTCCCTGCCCATGGCTGATGAACTGGCCGGATCTGCCAGTTCC  
TTCGGCTGCGACTACCTGGCGCATCGCGATGCCAGCGGGCTGGACGTTCAAGTTCATGGCCGGAGGGATGGCCCTGA  
GCTGGCCGCTCACGCCACTCTACGCCACCGAACACTGGTGGCAGCGCGCTGGCTATGCCAACAGAACGCGT  
GCAAGCTGTCGACCAAGCGTCTCGCAGCAAGCTTCTCGAGGCTGGCTTCCCGAGTGGCTGGTACGTGAA  
TTTGTGGCAGGCCGGACGAGTCGACTCAAGCAGCATCAAGGCTACCTCGAACACTACACCCATCGGCGTTGAAGTACCT  
GGAGCCGGCGGCCGCTTACGAAGGCCCTGGCTATGACCAGGCCCTGCGTCAAGCAGGCTGGAGCACGGCAAAACACTC  
GCCTGCACCGCGGTCTAGCCGGCAGTTCAAGGCCGCTCGAGCAGGGAGGTTCCAAATGA

Protein sequence: (SEQ ID NO: 211)

MDKQKVLAKEKLMALANAKGATPNEAETALRQAAILKRQFDLSDAEI SAHTVETACVPTTRRSPAPWLHELAGICASS  
FGCDYLAAYAMPAGWTFKFMGRGIGPELAHAHAYSTLHQLVAARSAHVAQQKRCKLSTKRRRSKLFVEGWLLAVRSLVRE  
FAGRPEDESTQAAIKAYLELHHPALKYLEPAALTAKALYDQASLQAGWEHGKNTRLHGVSRVQGALEQGGSQ

**FIGURE 30U**

RL112

DNA sequence: (SEQ ID NO: 91)

```
ATGAGTGACCCCAAGCTCAAGCCCTGCCCCTGCGGAGCGACGAACATTGAATGCTGGAACCCGAGCTGCTGACAC
CGATGCCCTGGAAGTGTGCAATGCTGGACTGCCAGGTTACATCGGGCCGTCTACTCGAGCCAGACCCGGTAA
CAGCGAGGTATTCAAGCACAGATGCACTGGAATAGACGCCAACGGAAAAACACCGCGGAGCGTGAAGCAGTTCTG
ATGGCCAACCTGCTCCGCCCTGAGGCTGCACTGGGCGACCTAGCAGCCCTGGCTATTGTCGATCGGTAAGACAGGC
CACAGACCAATTATACCAACTTCAAGACCTCTCCCGTGTCCCGAGGCGTGGCTGATGCGCCCTGGCGCCGGCGCC
AGATCACCGTCAAGGTTTCGATACCGCAACGACGACTGGCCTGGCGTGGCTGATGCGCCCTGGCGCCGGCGTGTACCGG
CTCCATGCCGGCGGATCGGCACCGACTGGCCGGCGGATTCCGAATGGCTCTGCACTGTCTGGCCCTGGGACGAAGA
GTGGTGGAAAGCTAAGTGGCGCGAGAACCTGGTACCGCAGGCGCCCTAGTGCTGGCCGAGATCGACGCCCTGGACC
GCTCCGCCACCGAGCAGGCTCAACCATCTGCAAGGGGGCGCTAA
```

Protein sequence: (SEQ ID NO: 212)

```
MSDPKLPKPCPLCGSTNIRMLEPELLDTDWNCAIECLDCQVHIGPSYCEPDPVTARYSAQIDWNRRPSAKNHADEREQFL
MANLLAALEVALGDVAALAIVDVRVRQATDRIYPTSNLSPVPQAWLDVQAERRQITVEGFDTSNDDASAGLIALAAGCYA
LHAGGIGTDWPGGIRNGSALFWPDEEWPKSARENLVRAVLAETEQLRSATEQGSTICKGGA
```

RL113

DNA sequence: (SEQ ID NO: 92)

```
ATGAACCTCCAGAACCGCAACAACTCCACTGAGCTTGATGCCAGACCCAGTTGACGCCCTACGTGCAAGGCTACAT
GGCCAAAGCAGCGCTGCCGCCGTGCTTCCGAGAATCTGAAATCGAGGCTGAAGGTGCTGCGATGTTGCAAGGGCCCTGG
TCGCTCCGGTTCGCGCTCAGCAGCGCTGCTGTGGACAGTCCCTGAGAACGCACTGCTCCAATCGCCACGACCTACTG
TTGAGACGAAATCGCAACTGGCCATCGCGGCAATGCCAGTTGATCCAAGTGATCCAGGGGACATGAAACAGGGCGAT
CTGGAACATAGCTACTGCCATCGATCACCTGGCGAGTTGCCAACCCCTGCAAGGACACTGTGAGGGTATCGAACGGC
TGATGCTTCTCGCAGCTCATCAAGCACTGAAGGCCAGCACTGGCCCGAGGCAATGCGGTGCTGGCATGAGC
GTGGCAGGCCCTGGCATGA
```

Protein sequence: (SEQ ID NO: 213)

```
MNLQRNRLNLLSLIAETQFDAYVQGYMAKAGAAAGASENLQIEAEGAAMLQGLVAPVRAQRACGQSLQNALLQIAHDL
LQTKSQLAIAANASSIQLIQRDMNRAIWNIAATIDHLEFAQPSQDTVRVIERLMLFVGSSSTEQQQLAAEANAVLGM
VGGLA
```

RL114

DNA sequence: (SEQ ID NO: 93)

```
CTGAACAGTTGGCAGCGCCGACCTTCGGAGGCCAGCAGGCCAAATTGACCGGCCCTACCGAGAAATACGCAAGCT
GACTGGTGGCGGTATCGACCTGTTGGGAAGCTGGGGTCTACTTGAGCTTCAAGAAAAGCAGCTCTACAAGACGCG
CGCGCTTGCCTCGACTCGGTGAACAAGCAGATCGAGCATCGGAAGGAAAGCGTGTGCTGCTACGAGAAAAAGCCAAGAAG
CGCGCGAGCTACGTGAGCGCTGGCCAAGCAACTGGTGCCTCGAAGTACCCGCTTCCGGAAATACGCTCGAAGATCG
GCTGGAAATCTGCAAGATCGCTTGTGATCTACAACCGGGCAGGGTGTGATCACCTGTACTCCACGCAACAGCTCCACT
CAAAACTCAAACGCTGGCTGGAGCGTCCAAGCAGCTCATCGGATGGCGCAGTGAAGCCAGTATTTCGCTAGTCAGGTG
GGGAGGCTGCGATGTGACTTCATTAGCCATCTGACTAACGAAATCGCGTACGACGATGGCAGTGAAGTCGAGGAGCGCT
CGCGCTCATCAAGCAGAACGCTCGTCACTGCAACCGCAGATCGCTCTGACCAGCGAGGAGCAGGAAACCCCTCGGCTCT
GGACAGACGCTCTGCAATCGGCTCCGGAGGGCTCATATGA
```

Protein sequence: (SEQ ID NO: 214)

```
LNKFGSAADLRSQQAKLTGATREIRKLTGGIDLFGKLGCGLSFEQKQLLQDAARLLDSVNQIEHAKERDRYEKAKK
RRELRLERLAKQLVASNYPLPGNTLEDRLEIQLIYRNARVFHDLYSTHQLHSKLKRWLERPKQLIGWRSEAEYFASQV
GSLRCDFISHLTNEIAYDDGSEVEERLVIKQKVADCTAQIALTSEEQETLRLWTDALQSAPEGLI
```

RL115

DNA sequence: (SEQ ID NO: 94)

```
ATGAATGCGAAAGCGACTTCGGTTGATCCACCAAGGGGGTAGGAAATCCACCAACCGCCGCAACCTCGGTGCATT
TTGCGCCGATGCAGGCTACGAACCCCTCTCATCGATCTGGACCCGTCAGCCCTCTATCCTCGTACTACGAGCTGC
CGGAAGTGTCCCAGGGCGCATTTACGACTGCTCGCCCAACATAACGGACCCGGGAGGATCATCTCAGGACGATT
ATCCCCAATCTGGACGCTGTGATTTCCAAGCAGGAAACAATCAGCTCAACAACTACTGCTCCAGGGCCGATGGCCG
GCTACGCCGCGAACCTGATGCCCGCTCTGAAAGAAGGCTACGACCTGGTGTGATCGACACCCAGGGTGCCTCGTCA
CTTGCTCGAAATGGTTGTGCTTGCATCGACCTGGTTGTTCCCGCTTCAACATGCTTACCCGGCTGAGTT
AACCGCGGACCATGCAAATGCTGACGCCCTACGCCCTATGAGCGTCTCGGATCGGATCCCCAATGTTAGATCGT
CATCAACTGCCCTGGACCAAGACCAATGACTCCGGCAATTCAAGAGAATGTGGTGCATCTCGATGAGCATCAGGACA
TTCTGCTGCTGAAACGACTGTCCGGATGCCGTGCTGTTGCAACGCACTCGCAGCATCGCGGGCTACAGCGCACCGCCTC
GAAACCGGCAACCCCTCCAATCGCACATCAGCGCCCGCTGAAATCATTGAAACCTGGCCATCGAGGTTCTTCCG
GTGGACTGACCGCTTCTGGCGTACGCCGGAGGGGGTTGCAAGCACTGGTCAAGGGAGGGCGCTGACATGGCGAAGAC
TCCTATACCCAAAGCCCGGACGCTGACGCCAACTTGCTGCTGAACTGA
```

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
Applicants: Laurence Rahme et al.  
Filing Date: September 12, 2003 Serial No.: Not Yet Assigned  
Page 67 of 118 Customer No.: 21559

**FIGURE 30V**

Protein sequence: (SEQ ID NO: 215)

MNAKATSVVSTKGGVGKSTTAANLGAFCADAGIRTLLIDLDPVQPSLSSYYELPEVAQGGIYDLLAANITDPARIISRTI  
IPNLDVVISNDQNNQLNLLQAPDGRRLANLMPALKEGYDLVIDTQGARSALLEMVVLASDLVVSPLOPNMLTAREF  
NRGTMQMLDGLRPYERLGMRIPNVQIVINCLDQTNDRAIHENVRAIFDEHQDISVLETTVPDAVFRNAASRGLPAHRL  
ETRQPSNRTSAPALEIIRNLIAIEVFPFWTDRFLALTPGGCSTGQGRALTWRRLLSPKPATSTRNLCWN

**FIGURE 31A**

RS01

DNA sequence: (SEQ ID NO: 95)

```
ATGGGGATCTACCGCCCGAAGCAGTCTCGCTAGCGATACCGATACTGAGGGGCCGGTACCGGACGAAAGGTAGCTGCG  
CCTCCCGCAGTTCGCTAGGCCCTGAGGAAAAATCTGAAATTACCGAGAGCGCCCTGATTCCACCGCCGGCATGCTGGCA  
GAGCCCCGCAATTCAAGGCCAACCGCAGTACCCCTCTGTAATCGCTGATTACGTCGAGGGCACATTGCTACGCCCTGCA  
GAATGGTTCAAGGCCCTGAAAAACAGAAAAGCCACCTAAATAGGCAGGGCTATTCCATATTGACATCACGTCAATGCGGG  
CC
```

RS02

DNA sequence: (SEQ ID NO: 96)

```
--ATGACGCCGAGCAGCTACCGAGGAGTACATCTCGCGCACGATCTCGAGAAGCCAGCGCGAAGATCTACCGGCCGC  
GACCAAGGCCGCTGCTCAAGCAGCTCGGCCCTACCGCAACCGTACAGGAGGTGACCCAGGGTCTGCTGGGATGCCGGC  
GCAAGGGTCTGGAAACAAGGCCGCTGCGAACACTGAGCTGGGAACACGATCTGCAACGATCTGGGCTATGCC  
ATCGAGCACAGGCTGGTCAACACTCCAAGCTCACCCGTTCAAGAACACCCGTCATCCCCCAGGGAGCGAACGAA  
AACCGTCCAGCCGAAGCCATCTCGCGGCCCAATTGGCTCAACATCAGGTCGGCGCCGAGCGCTGCACTGCCGATC  
GCCGACCCATCACTCCCGCTGGTCTGGCTTCACGTTGAGGTCTCTACTTCACCGGCATCCGGTTGAATGCCGCTG  
TTGTGCACTCGCAAGCGCAGACTGGAAAATCAACTGATCCTCATCCGGCGAGACAGAGAAAATCATAAAGA  
GTTCGTAGTGCCAATAACGGAGGGCTTGTGCCCTACCTATCGGGCTCTGCAAGGAGGCCATAGAGCCGGATTGCCG  
ATGACGACCAAGTGTCAACGTCACCGGTTCTACCGCACTACAAGGCAAGGTGATGAACTCCGACCAAGGTGCAAGCC  
ATGTACCGGAAGTGTGACCGAGAAGGTTGGGTGCGGATGACTCGCACCGTTCCGGCACACCCCTGGCCACCGGACTTGAT  
GAAGGCACCCGAGCGGAACATCCACCTCACGAAGTGCCTGCTCACCCACTCGAATATCAGACCCATGAGCTACATCG  
AGGCCGACTACGACCACATGCGTGGCGTGCATGCCAGAACCTGGCCAAGGACGGCTGGAGAACGTCAGGAAGGTG  
GATTACAGCGGCTCCCGCAAGCCTCTGCCAAACCGAAGCCATCGGGCAACCTCTCGCTCGAATGGGTGAAGCGCCG  
ACAGGAGGCTAGGACAGAACCTGCGAGAACCAAGGGAGCACACACCAGGGCAGGGCATTAGGGAGATGCAACCGCTGG  
AAGAAGGCTTACCAACAGCCACCTGACACCTTCAGCAAAAGCTGCTGTTACTCTGATGGCTCAACACCTATGAACCGT  
GCCGCCACGGCTCCCGGGCTTCCACCGCAACAAGGGATCTGGAGGATGGGATCTACCGCCGAAGCAGTCTGCCCTA  
G
```

Protein sequence: (SEQ ID NO: 216)

```
MTPQQLTEEYI FAHDILREASAKIYRAATKALLKHFGPTATVQEVDRHRSVLGWRKVLEQGLSKRSWNTYSNHLRTIWGYA  
IEHELVTHSQVNPFRTTVPPIRRASKTVAAEAI LRARNWLNMQVGAERCTGDRARITPAFWLCTFEVFTGIRLNAL  
LCIRKRDIWENQLILI RGETEKTHKEFVVVPITECLVPHLSRLI LQEADRAFGADDQLFVNRFSPHYSKVMNSDQVEA  
MYRKLTKEVGVRMTPHRFRHTLATDLMKAPERNIHLTKCLLNHSNIQTTMSYIEADYDHMRRAVLHARSLAQGALENVRKV  
ATSGSPQASAKPKPCQQPLARMGEAPPQEARTPEAEPREHTPGTGIQGDATAEEALPQPPTFEQSVLFTLMAQHLSNR  
ATAASAATSGGGWGSTARSSLA.
```

RS03

DNA sequence: (SEQ ID NO: 97)

```
ATGAAATCTGGTATCGCGACCCGTCGCTGTTCATCAACGACACCAAGGCTTGGTCATACCGTCGACGGGACCGCCAT  
GCTGGTCACCCGAGGAATCTCAAGCGTTATGTCAGGAGCATCCGGAGGTTGAAAAGCTGGCCAGGGCAAGGAGACCG  
CCGGCTGGAAAGCTGGTCAGCGCGCTTCAGAAACAGGGTCTCACCGAAAGACCAGTAAGAACCTGAATATCTGGACC  
ATCAAGGTTCTGGTCTCGCAAGACGAAAGCTAACCTGCTCCAGGATCCAAATTGCTGTTCCCTGTGCA  
GCCTCTGGACAACCCAAGCCTCACGGTCATCACCGATGCCGAAGGAGGTGCGAATGA
```

Protein sequence: (SEQ ID NO: 217)

```
MKSGIATRRLFINDTKALVHTVDGTAMLVTPGIFKRYVQEHPVEKLAQAKETAGWKLVQRAFEKQGLHRKTSKNLNIWT  
IKVSGPRKTKELKAYLLQDPKLLFPVQPLDNPSLTVITDAEGGVE
```

## FIGURE 31B

### RS04

#### DNA sequence: (SEQ ID NO: 98)

```
ATAGACCAGTTGAGTGAGCAGGAGTCGGTGGAAAGTGGTCTGCTCAGCTTCGATGTGGCGCGGTCTTGCTACTACGTCCA  
CGCTTCTCGACGGCGCGTGTGATGCTCGCCCGTGGCGTACCGCAGCCAAGTCAGCTCAACCAGTTGTTCAGCCAGAGTCGGG  
GCTCGGGCGCAGCCAGCATTCTGGCATGCTGCGGAAGAGGGCGTGGACCATCGGCCGTTCCGAGTCGGTGGITG  
ATGCGTGAAGCTGGCCTGGCATGCAAGCAACCCGGCTCGCACGCCCTACAAACAGGCCACGGTGAGCGGGCGGATATCCC  
GAATCGGCTGAACCGCGAATTCGCGACCGAGCATCCCATACAGGTGTGGTGAGCGACATCACCTACGCTCTGGCGCAAG  
GCCGTTGGCACTACCTGGCCGCGGTGGATCTGCTGATCGGCTGGCGTTCTCGGCCAACCGGATGCCGACTCGT  
ATCAAGGCCCTGGACATGGCCTACGAAACAGCGCCGAGGCCACAGCAGGTGTTCCATTAGACCAGGGCAGCCAGTA  
CGCCAGCCGCTGTTCGCAACGGCTCTGGCGCTATCGGATGTCAGCAGAGCATGAGCCGTCGGGGAAATTGCTGGGATA  
ACTCGCGATGGAGCGCCTGTTCCGAGTCGAAGTCGGAGTGGTCCCGTCAACGGGTTACCTGACGGCCAGGAGGCC  
CAACGGGACATCAGTCATTACTTGATGACCGCTACAACTGGGATCAGGCCGATCAATTCAACGACGGGTTACCACCTGC  
GGTGGCGAAGAAAACCACTGTCGGGATGGGTTGA
```

#### Protein sequence: (SEQ ID NO: 218)

```
IDQLSEQESVEVVCASFDFVARSCYYVHRLRRRVDARRVALRSQVNQLFSQSRGSRSRSLIGMLREEGVTIGRFRVRL  
MRELGLVSKQPGSHAYKQATVERPDIPNRLNREFATEHPIQVWCGDITYVVAQGRWHYLAVLDDLIGWAFSAKPDAELV  
IKALDMAYEQRGRPQQLFHSQDQGSQYASRLFQRQLWRYRMQSQMSRGNCDNSPMERLFRSLKSEWVPSTGYLTAQEA  
QRDISHYLMHRYNWIRPHQFNDGLPPAVAEEKLNPPLSGMG
```

### RS05

#### DNA sequence: (SEQ ID NO: 282)

```
ATGAGCAAGCAACGACGTACGTTTCCGCCAGTTCAAACGAGAGGCCGCCCTGGTGTGGACCAAGGCTACAGCCA  
TATCGACGCCCTGCCGCTGGGCTGGATTCCGCCCTGGCGCTTGGTGAAGCAGCTCGAGGCCAGCGCCAGG  
GTGTGACCCCGAAGAGCAAGGCGTTGACGCCCTGAGCAGCAAAGATCCAGGAGCTGGAAAGGCCGATCACCGATTGGAG  
CGGGAGAAAGCGATATTAAAAAGGCTACCGCTCTTGATGTCGGACGAACCTCGATCGCCTGA
```

#### Protein sequence: (SEQ ID NO: 219)

```
MSKQRRTFSAEFKREAAALVLDQGYSHIDACRSLGVVDSALRRWVKQLEAERQGVTPSKALTPEQQKIQELEARINRLE  
REKAIKKATALLMSDELDRTR
```

### RS06

#### DNA sequence: (SEQ ID NO: 99)

```
ATGTTGTATTTTCTTCAGTATGAAGATGGGTGGTTGGCGATATAGGTACTTCTCTATTTCTTAATTGCTCT  
CATCTATGGGTGTGCGGTTGGAGGTGGATCGGATGAGATTGGCAGCACTGCTTGAGAGAGAGC  
GAGTTAATGATAATGAAGAGGGAGTGTGAGGTTGAATCGGCTGAACTGCGATCCAATTGAAGTCGTGTTCTGAATCA  
GAGAAGCTGATAAGAAAGCCGCCAATGAGCTGGTATTCACTGA
```

#### Protein sequence: (SEQ ID NO: 220)

```
MLYFSCSMKMGWGVGYRYFSLSLIALIYGVGCCCCGDEIGQHCFEREQKLSGVNDNEEGSVRLNRLNCDPIEGRVLES  
EKLIRKPPNELGIH
```

### RS07

#### DNA sequence: (SEQ ID NO: 100)

```
ATGAAAAAAATCACTTGTATGTCGGCTGTCTTGGGGTAGCAATTCCGGTGTGCTGATGAGGGCTCAAATGATGG  
AAGTGAGATATGTCGGCGCAGGGTGGAGTTGAAATAACAAGTCTGGGGAGTCTCAAAGGGTGTGGATGTTGAAGATG  
TTGAGTTGTTGCAATTCTCCAAGTAATATGAAGTCGAGTCAAAGAGCGCCTACACTCCCTCTGCAAGGATGATC  
ATTTGCGCAATGCCCTCACAGGAACGGTCACTGTTCTGCCAGCGGAGATAGGAAATTACAACATCTTGGGGCAA  
TCTTATGCTCACGGTTATGCCAATTCTATCCAGACGGTGTAGCAGGGAAACATCAGATCTACGATGTGTTGTTACA  
ATACACCCGGAAATTCAAGGGTGTATGTCATGGGACGCCCGACCGACATTCAATTGGGTGTTGAGCCATAT  
GGCGGATCTGTTGTTAAACTACAGTGCAGTCATTCAAACACGATTCCAGTGTAAATGAGCTACAGTTATCGTGA  
TGGCGGGCAGTGTATGGCGAGGTCCAGAATGTGTCAGGAATAATAATGTGGTTGAACTAA
```

### FIGURE 31C

Protein sequence: (SEQ ID NO: 221)

MKKSLVMSAVLLVASNFACADEGSNDGSEICRAQGGVEITSLEVSKGVDVEDVVVCSILPSNMKSSQRAPTLPPQLQRM  
IISAMPSPGTVTVSASGDRKFTTSCRANLYAPRYANFYPDGVSRTSDLRCVGYNTPGNNSQGCNVSDGPTDIQLGVEPY  
GGSVVVNYSCTAFKTTIPVIMSYRDGRAVYGEVQNVSGIINVVLN

RS08

DNA sequence: (SEQ ID NO: 101)

ATGCTTATTAAAATTCTTCAATTATATTCTTGGCTATAGTTGGTTGGCACAGCAGGCTGCTGCCCTCCCCGCCCGC  
AGAGTCACACTCGAACATCTGAATCTTCGTATCGATGCCAAGTCATGGAGCACGCTGCTTATAACTGCA  
TGGCTCAGCAAATGACTCCACCCAAAGAGGATCCTCGCGTCCGAAACCTACCTGAACCTCACATTAGCGTCTGAACCG  
GCCACTCGCCTGCCACCCACAGACAGGACTTTTACCGCCATCATCAACGTGCCATATCGAAAGACTAG

Protein sequence: (SEQ ID NO: 222)

MLIKILRIIFLLPIVGLAQQAASPPAESHSESEQSESSCIDVQVNGARSLSYNCMAQQMTPPKEDPRRRNPLNISTLASER  
ATRLPPQTGLFTSLHQRAISNSKD

RS09

DNA sequence: (SEQ ID NO: 102)

GTGAGTAGTACTAAGAGTAAGCCGATAGCCAGGGGGCGTGGTGGCCCATTGGGAAGTGATGAAGAGGTGGGGCTTGT  
ACCGGTTCTGAGGAAGGAATAGACAGCAGACAGGATCGCTTGCATGGGCAGCAGGAAACCATCAGCCCGTCCGTATCCA  
GAACTGCTGCTGAGCGTTAGGGGTGACTCCCTCATGCCCTAG

Protein sequence: (SEQ ID NO: 223)

VSSTSKSPLIARGGGPFGEVMKRCGLPVPRGRNRQQTGSIAMGQQETISPSVSRTAACSVRGDSLMP

RS10

DNA sequence: (SEQ ID NO: 103)

ATGGAACGCTTCTGAGAGCATTACATCAATGCCGCCGGCGATGGAGTTGAGGCTTAGCCTCACAGCTCCGGCG  
CAAGAGAATGGTAAAGATTGTGGATGGGAGGGAGGTGAGGTTCTGCCAGGTGAAGTGCAGGGCATCCTGGAGGCCAAA  
AGAGGGATGTTGAATCTCGCCGACTCTTAGCCAAGAGTCTGTCGCGCAGCCTAG

Protein sequence: (SEQ ID NO: 224)

MERLLESIYINARPAMELRLSLTSSGRKRMVKIVDGEEVEVLPGEVQGILEAQKRDVGILADFLAKSLVARR

RS011

DNA sequence: (SEQ ID NO: 104)

ATGGAATGCCACGTTCTGCTCCGCCACGAGCAGAGATGCAGCAGCGATAAGCTGCTAGTTATAGCCGCCCTGCGTGAGTC  
AAATTCAACAGGACTATCCGCTGTGATGTCAGCTCAGGTTGAGCAGAGCTTTCTCTGAAGCCATCACACAGCTTA  
CGAAGCGTAGGGTCTCGTAGCCTATTGGCGAAACATTATTGCACTGCCGTCTCGACGGTGACGTCGTCAGAAGT  
GTTTCGTTGACCCAGCTCACCAGAAAGCGGTATGGCGGCAATTGATGGATGTCATTACATACAACTGCTGCCAGCG  
GGAGATGGAGCTGTACGTGTGCCATCGTGTACAGCTGAAAGGTTTATACCGCATTGGTTATCAGAAAATCCGCG  
ACCGAGTTCATGGGGCGAGCGCACCATCGTTATGGAGAAGCGGTGAG

Protein sequence: (SEQ ID NO: 225)

MECHVRPATSRAAAISCVVIAALRESNSQDYPDVIAQVEQSFSPEAITTQLTKRRVFVALLGENIIGTAGLDGDVVR  
VFVDPAHQKGGIGRHLMDVIHTTAASAGVGAIVPSSITAERFYTALGYQKIRDEFHGAERTIVMEKRL

**FIGURE 31D**

RS12

DNA sequence: (SEQ ID NO: 105)

TTGTGGTTGACCTGACGCCACAGCAGGATGTGCAAGGGCGGCTTAGCTACAGCGTCGATACTCTGGCCAGTTCCACCA  
GTTGGCGCTGCACTCGCTGGTACACTAGCCTGACCCGCTGAGGAAGTCGAGAAAGAACGCTCTGCACTGCCGTCTC  
CTGCTTGGAAAACGGATTCTACTAAGTTAGCGTGGTACTGAATCGGGGGCAGGTCAATCGACAAAGGTATCCCGACC  
GCAGGTTGTTGGCCACGTGATGGTGGCAAGTTTGGCGATCACTTGCCGCTGTCACCGCAGGAGAAAATTTGGCCG  
CGCCGGCTGGCAATTGCTCGCTGACCCCTGGCCAGTGGTGGACAAACCGCGTGCAGGCTTCAAGCCACTGTCGATG  
CACTGCGTAAGCCGTGCAACCAGGGCGTATCCACGCTGATGAAACACCCGTGCAAATGCTTGCAGGAGAAG  
AAAACCCACCGGGCTATGCTGGCGTACAGCACGACGCCGTTTCAGGGCTCAAAGCGGTGTTTACGACTTCAGCCC  
AAGCCGTGCTGGCGAACATGCGCAACCTCTGGGTGACTGGAACGGCAAGCTGCTGCGACGACTTCGCTGGCTACA  
AAGCCGTTTGAACAAGGCATCACTGAAATCGCTGCACTGGCCACGCCCCACGCCCCCGCAAGTCTTGAATTGACGTGGCG  
AACAAAATCAGCTGGCTGAACAGGCCACTCGATCAGGGCTTGTACAGGCTGCAACGTCAGGCGCCGGACATGAG  
TGATGAAGAGCGCTGGCGAACATGACAAGAAATTGGCGTGGCGCTCAAAAGACTGATGACTGGATTTGGCTCAGC  
GAGACCTGGTGCCTAATGGATCAGGCCAGGGCAAAGCCCTGATTACAGCTGAAACGCTGGGTAGCGCTGACCGCTAC  
CTGGACGATGGGCTGCCCATCGATAACAATCAGTCGAGAACAAATACGGCATGGGCTCGGGCTCGAAGT  
GCTGTTGCCGGTGCAGTGGTAAACGGCGCTGCAATCATGAGCCTGATCTAG

Protein sequence: (SEQ ID NO: 226)

LWLTCTPOODVQAAALATASILLGQPHQLGVQLGRYTSLDPLEVEKNASALPSPAWKTDSKFSVVLKSGGRSIDKGIP  
AGLLAHVMVAKFADHPLYRQEKFIFGRAGLAIARSTLAQWVQGTQVRLQPLVDALREAVLNQVIHADETPVQMLAPGEK  
KTHRAYWWAYSTTPFSGLKAVVYDFSPSRAGEHARNFLGDWNGKLVCDDFAGYKAGFEQGITEIGCMAMARRKFDLHVA  
NKSQLAEQALHSISGLYEVERQARDMSDEERWRIRQELAVPILKLHDWMLAQRDLVPNGSATAKALDYSLKRWVALTRY  
LDDGAVPIDNNQVENCIRPWAJGRSNWLFAGSLRGKRAAAIMSLI

RS13

DNA sequence: (SEQ ID NO: 106)

ATGGTGGGGCGGGGGTCGGCTGGCGCGCAATGCTGAGCTGAGCGCACCGAACAGGTCTTGTGATGGA  
TTTCGCTTCGACCGCTCAGCACTGGCGACGGATCAAATGCTGACGGTGTGATGACTTCACCAAGGTGCTGGT  
ACATCTGGTGGAGTACGGTATCAGCGTTTCTGTCACGGGGCGCTGGACGAGATGGCGGGTTCTGCTACCCG  
CAGGGATCCGACCGACCAGGGCCCGAGTTACCGGCAAGGCCTTGATCAGTGGGCTGTGAGCAGATCAAGTT  
GAAGCTGATTAGCTGGCCAGCCACGCAGGGCCTTACAGTCATTCAACGGCAAGTCCGGGGAATGCCCTCA  
ATGAGCAGTGTGCTGGTGTGCAAGGCAGAAATCCGATTCGCGCTTGGCGGGATTACAACGAGCACCGACCACAGCGCC  
ATTGGCAATCTCTCCCGGAGCTGCTGCAAGTGGCAACCAACCGAGCAGCTGAAGCGGGAAAAGTTGATATC  
AACCCATAG

Protein sequence: (SEQ ID NO: 227)

MVRRRVAARECLSLSSAPNQVLSMDVFVFDALSTGRRIKCLTVVDDFTKVSDILVEYGISGFRVTRALDEMARFRGYP  
QAIIRDQGPEFTGKALDQWACQRDIKLKLIQPGQPTQSAFIESFNGKFRGECLNEHCSLVEARIRIAAWRDYNEHRPHSA  
IGNLSPAELAAKWRTNQQQLKREKLISTP

RS14

DNA sequence: (SEQ ID NO: 107)

ATGCATATCCAATCGTTGGGGCTACTGCCCTCGCTGAATCAGGAGCCTGCGAAACCCCGTCGAGGCAGCGCATAA  
GTCCGCCAGCTTGCCTGAGAACCTCAGGGCAAGGTCTCGGGGTGCCCTAAAGAGCACGCCGGAAATCTTCCGGGA  
AGTTGCCGGAAAGCCTAGGGTGCAGCTGGCTTACAGCAGTCCCACAGGAGTCACCGAGCTAACGCTAGTCCGCCACATTGACCAGTCT  
GGCCCGCCAGATCCTCGCCAGTTGAGAACAGCGAGTCACCGAGCTAACGCTAGTCCGCCACATTGACCAGTCT  
GGCTTAAGCGCGTGGTGCAGGAAAGCTGCGGATCACCCGGGCAATGCTGGCTAGAAGAGAAAGGCATGCTGATG  
GCATCCGAGCATGTCCGGTTCTCGCTGGCGCATCACCGGCCCTTGGCTCAGGTATGAGCCCGGGCGTTC  
AAGACCCCTTCGACAAGATGATCTTATTGCTGCTGAGCAGCTGAAACAGTCAGCTGAAGCTGTTCCAACACATTAG  
CAGCGAGATCGCGCATCGCTGAAAAGGGCTGGCAACAAGATCGCGCTTCTGACTTGTGCTCAATGTA  
CACGCATAGATTGCGGGCTGAGCCCTAGAACGCTATTGCGCAGCAGACAGCAAGGGCTGCTGGACAGATCGCT  
ACCCATCAGAGGTTGACGCCAGGCCACCGCTGCCATGCCAGCAGATTGCAAGTCCGGCTCCGGAGTCACCTTGG  
CGATCTAGATCGGTTGAGTGTCTAACCTCCCAGATTAAGACGCTGAACATCACAGGTACCCCATGTTGGAGGGCGTC  
CGCAATTAGTGGTGTCAATGCCAGCCACACACGGGATCTGGAGGTGCCTGGCGGACATATCTCCGGTTCTTCCA  
GGAGTTCCAGAAGGTCAAGCTGAGTGTACGCCGTTACAGCGGCGTAGAGTGGAGCAAGATTCCAGGATGGCGGGGT  
GATGATTAACGTCGGCTCCCTGAGATGATGACAAAGAATTGACAGCGGGCAACTGCGGCCAACGACAACCTGATCC  
TTGAGTTCGAGGGCGAAGCTGGGGAGGTAGCGCCGACCGAGGTACTAGGGCGCGCTCAAGGGCTGGCTGTC  
GTGCGCTGCCCTGCAAGCGCGGAAATGCTGAGCTGAGGGCTGGAGGAATTGCGCGAGCAAACCGTTGTTGGTGC  
GAAGAGCGAGCGCGGTTGATTTCACTGGAGCTGCTGGCACCTTGAACCTTACCATGCGGAGAGATCAAGCGC  
TTCAGGAGCGCTCCAGGAGCGAGTCGGTGAACATCTGGAGAAACGTCTTCAGGCTTCAGAGCCTGACACCTCGCTTCT

**FIGURE 31E**

CTCGACGGCGCTGGCACTTGATGACAGTATGCTCACCACTGGCTCAACAGAACCCGGAGATCACAGACGGGGC  
GGTGGCTTTGCCAGAAGCGCGGATGCGTCACTGGAGCTGACTGTCGCTATCGTTAGGCCAATGGCTGGCGGTA  
GGCTCAAGTGGACGAGGCTATGCCCTCGCTCTCAGCGACTCGATGCGCTGGCAGATACTCCGGAACGCCAGCATGG  
TTGGCAGCTGAGTTGAACCATGCTGATAACGTTGATCATCACCACTTACTCGATGCCATGCCGGGAGACGGTGCAGTC  
GCCGGTCTGCCCTGCGTTAGCAGAGCGCAGCGCCCAAAGTGGCGTTATTGCCGAGAACATTGTAAGGAAGTTA  
TCTTCCCCCTCTGATGCCCTGCCAGCGGATTCAACGTAGCTGTTACGTCGGCGGAGGAGCAGCTACGGCAT  
GCCACCACTCCGGCGAAATCAATCAAGCGCTAACGATATCCTCGACAACACTACTCGGACAGGCTTCCGCTTCGG  
CAAACCTTGAGTTGACTACCGTTGAGATGGCTAACGGCTTGGCGGAATAAGGAGTTCAACATGATT

**Protein sequence (SEQ ID NO: 228)**

MHIQSLGATASSLNQEPVETPSQAHHKSASLRQEPGQQLGVALKSTPGILSGKLPESVSDVRFSSPQGQGESRTLTDSA  
GPRQITLRQFENGVTELQLSRPPLTSLVLSGGGAKGAAYPGAMLALEEKGMLDGIRSMSSAGGIATAALLASGMSPAAF  
KTLSDKMDLISLLDSNKKLKFQHISSEIGASLKKGLGNKIGGFSELLNVLPRIDSRSAEPLERLLRDETRKAVLGQIA  
THPEVARQPTVAAIASRLQSGSGVTFGDLDRLSAYIPQIKTLNITGTAMFEGRPQLVVFNASHTPDLEVAQAHISGSFP  
GVFQKVSLSDQPYQAGVEWTEFQDGGVMINVPVPEMIDKNFDSGPLRRNDNLILEFEGEAGEVAPDRGTRGGALKGWVVG  
VPAQKAREMLQLEGLEELREQTVVPLKSERGDFSGMLGGTLNFTMPDEIKAHLQERLQEVGEHLEKRLQASERHTFAS  
LDEALLALDDSMLTSAVQQNPEITDGAFAFRQKARDRAFTELTVAIVSANGLAGRLKLDEAMRSALQRLDALADTPERIAW  
LAAELNHADNVDHQQLLDAMRGQTVQSPVLAALAEAQRKVAIAENIRKEVIFPSLYRPQPDNSVALLRAEEQLRH  
ATSPAEINQALNDIVDNYSSARGFLRGKPLSSTTVEMAKAWRNKEFT

**RS15**

**DNA sequence: (SEQ ID NO: 108)**

ATGATTGATACATGGCTGGCACAGTGGGCTTGAGACTTCCCTCGAGCAACGATGCCACGTTGCGGCTGCAACCGGCAGA  
GGGACCGGAACCTGGTTATGGAGGCCCTCGAGGGGGTTGGCTTTCGTCGTCAGTTGGACTTGTGCCCTCAGGGTTAC  
CGCTGGGTGTGATCTTCAATTGTTACAAGTGAACCTCTCATCTTCATGCCGACCGGTAAACCTTGCAGGGACGAT  
GCCGGTAGACTTGTGCTCTGGCTGAGGCACGTGATGGCGTTGACGATGTGGATGCACTGAAACCGCTTGACGATAGGCT  
GCGGGAGGACATTACGATTAGTGCCATTGCTAGAGCCACGGGTGAGTTGGTCCAGCTCAGATAACAAACAGCGCGT  
TAGTGTTCGTTGA

**Protein sequence: (SEQ ID NO: 229)**

MIDTWLAQWGLRLPSSNDATLRLQPAEGPELVMERLEGGWLFVVELGLVPSGLPLGVILQLLQVNSPFSSLAPVKLAADD  
AGRLVLWAEARDGVDDVDALNRLHDLREGHSLVPLLEPTGELVPAQIQTSLVVF

Big Island: Overall Nucleotide Homology

Total 84830bp

Bp #	Species, strain, gene name	Accession #	Evalve / %identity
23559-25465:	<i>X. axonopodis</i> pv. <i>Citri</i> strain 306	AE011864	83%
	Only stretches within the 20437-25465bp are homologous to <i>X. axonopodis</i> pv. <i>Citri</i> strain 306. A total of 1060bp, not contiguous, from this region are homologous to <i>X. axonopodis</i> .		
33872-38412:	<i>P. aeruginosa</i> , PA14, <i>pvrR</i>	AF482691	0.0; 99%
40989-46535:	<i>P. aeruginosa</i> , PA01, PA2128-2132	AE004640	80%
	Only stretches within the 40989-46535bp region are homologous to PA01. A total of 2406bp, not contiguous, from this region are homologous to PA01.		
48266-49533:	<i>P. putida</i> , plasmid pWWO	AJ344068	96%
	Only stretches within the 48266-49533bp are homologous to <i>P. putida</i> , plasmid pWWO. A total of 780bp, not contiguous, from this region are homologous to <i>P. putida</i> .		
56824-58706:	<i>P. syringae</i> pv. <i>maculicola</i> , plasmid pFKN	AF359557	83%
	Only stretches within the 56824-58706bp are homologous to <i>P. syringae</i> pv. <i>maculicola</i> , plasmid pFKN. A total of 1882bp, not contiguous, from this region are homologous to <i>P. syringae</i> .		
64748-64942:	<i>P. aeruginosa</i> , PA103, <i>exoU</i> ,	U97065	1E-85/96%
82447-85179:	<i>P. aeruginosa</i> , PA01, PA0984-0985	AE004531	0.0/97%
85334-855542:			3E-80/94%
93200-93317:	<i>P. aeruginosa</i> , PA158	X73064	7E-50/98%
108075-108610:	<i>P. aeruginosa</i> , SG17M, plasmid pKLC102	AF285416	0.0/91%
100119-101054:	<i>P. aeruginosa</i> , PA01, PA3849,	AE4802	0.0/98%

Small Island: Overall Nucleotide Homology

Total 10848bp

Bp #	(Species, strain, gene name)	Accession #)	E value / %identity
877-1632:	<i>P. aeruginosa</i> , PA01, PA0977	AE004531	0.0/94%
877-2603:	<i>P. aeruginosa</i> , SG17M plasmid pKLC102	AF285416	0.0/92%
2978-6471:	<i>P. aeruginosa</i> , PA01, PA0978-81	AE004531	0.0/99%
<u>7035-7999:</u>	<i>P. syringae</i> pv. <i>maculicola</i> , plasmid-pFKN	AF359557	83%
Only stretches within the 7035-7999 bp are homologous to <i>P. syringae</i> pv. <i>maculicola</i> , plasmid pFKN.			
A total of 534bp, not contiguous, from this region are homologous to <i>P. syringae</i> .			
7999-8284	<i>P. aeruginosa</i> , PA103, exoU,	AF27291	E-136/96
8000-8080:	<i>P. aeruginosa</i> , PA01 intragenic region	AE004531	E-18/91%
8120-8259:	<i>P. aeruginosa</i> , PA01 intragenic region	AE004531	E-24/85%
8272-8860:	<i>P. aeruginosa</i> , PA01 intragenic region	AE004531	E-176/88%
8470-11724	<i>P. aeruginosa</i> , PA103, exoU,	AF27291	0.0/99%

FIGURE 34A

ORF ID	Strand	Left end	Right end	ORF length (aa)	G+C content (%)	Location prediction	Gene name	Gene function	Protein with the highest identity (gene name / species strain)	E-value (% identity)	Proteins with lesser identity Cut off 30%	GenBank accession no.
RL001	-	878	1,202	pseudogene	56				PA0977 / <i>P. aeruginosa</i> PAO1	3E-45 (91)		AAG04366
RL002	-	1,692	2,232		60	cytoplasm		Hypothetical protein	PA0977 / <i>P. aeruginosa</i> PAO1	2E-10 (99)		AAO0847
RL003	-	2,449	4,368	639	58	cytoplasm		Hypothetical protein	PPSP0831 / <i>P. syringae</i> pv. tomato DC3000	E-180 (52)	XAC2196, XCC3121, STY4665	AAO54371
RL004	-	4,903	5,156		50	cytoplasm		Dideoxyuridine deaminase	MIKI566 / <i>Verticillium</i> sp. Kamikaze	E-13 (95)		AAV0420
RL005	+	5,436	6,146	236	51	inner membrane		Hypothetical protein	No significant similarity			
RL006	-	6,143	6,682		55	cytoplasm		Dideoxyuridine triphosphatase	VNG0244 / <i>Fluobacterium</i> sp. NRC-1	E-07 (2)		AAV0423
RL007	-	6,887	7,402	171	48	outer membrane and periplasm		Hypothetical protein	No significant similarity			
RL008	-	7,829	9,760	641	60	cytoplasm		Protein with multiple helicase ( <i>Verticillium acutum</i> C2A) and hypothetical protein PA1939 ( <i>P. aeruginosa</i> PAO1)	PP0120		AAO5538, AAO5321	
RL009	-	9,757	12,180	807	60	inner membrane		Hypothetical protein	PA1939 / <i>P. aeruginosa</i> PAO1	2E-69 (30)		AAQ05327
RL010	-	12,533	14,260	1,727	54	inner membrane		Hypothetical protein	No significant similarity			
RL011	-	13,102	13,452	116	60	cytoplasm	parE	Plasmid stabilization protein Agrobacterium tumefaciens C58	AGR_C_2415p / AGR_C_2415p / <i>A. tumefaciens</i> C58	8E-22 (45)		AAK87104
RL012	-	13,561	15,228	967	62	cytoplasm		Putative transcription regulator	AGRC217 / <i>A. tumefaciens</i> C58	2E-01 (1)	AAV0420	
RL013	+	13,847	14,191	114	48	inner membrane		Hypothetical protein	No significant similarity			
RL014	-	14,217	15,128	50	58	inner membrane		Hypothetical protein	XAC2185 / <i>Xanthomonas</i> sp. 306	E-75 (5)	AAV0420	
RL015	-	15,725	16,066	113	62	inner membrane		Hypothetical protein	No significant similarity			
RL016	-	16,969	17,348	46	6	outer membrane and periplasm		Hypothetical protein	PPSP0841 / <i>P. syringae</i> pv. tomato DC3000	E-198 (57)	AAV0423	

FIGURE 34B

RL017	-	17,466	18,404	312	65	outer membrane and periplasm	Hypothetical protein	PSPO0849 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	E-125 (72)	XAC2283, STY4576	AAO54384
RL018	-	18,201	18,335	14	62	outer membrane and periplasm	Hypothetical protein	SG57 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	E-122 (5)	XAC2283, STY4576	AAO54384
RL019	+	19,044	19,262	72	55	cytoplasm	Hypothetical protein	No significant similarity		XAC2275	
RL020	-	19,539	19,918	21	62	outer membrane and periplasm	Hypothetical protein	PSPTO0858 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	2E-23 (55)	STY4573, STY4572	AAO54393
RL021	-	19,915	20,199	94	57	cytoplasm	Hypothetical protein	PSPTO0859 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	2E-23 (55)	STY4573, STY4572	AAO54393
RL022	-	20,196	23,138	198	64	cytoplasm	Hypothetical protein	PSPTO0859 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	2E-23 (55)	STY4573, STY4572	AAO54393
RL023	-	23,138	23,581	147	64	inner membrane	Hypothetical protein	PSPTO0860 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	2E-48 (74)		AAO54395
RL024	-	23,559	25,064	50	67	outer membrane and periplasm	Hypothetical protein	PSPTO0861 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	2E-48 (74)	STY4570, ORF100	AAO54396
RL025	-	25,048	25,932	294	66	outer membrane and periplasm	Hypothetical protein	PSPTO0862 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	1E-90 (62)	XAC2272, STY4569	AAO54397
RL026	-	25,929	26,888	210	60	inner membrane	Hypothetical protein	PSPTO0869 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	1E-7 (59)	STY4569	AAO54398
RL027	-	26,585	26,971	128	65	inner membrane	Hypothetical protein	XAC2271 / <i>X. axonopodis</i> pv. <i>citri</i> 306	4E-29 (50)		AAM37124
RL028	-	26,982	27,438	118	60	inner membrane	Hypothetical protein	ORUH62 / <i>P. syringae</i> pv. <i>DC3000</i>	1E-23 (50)	XAC2270, STY4566	AAQ86817
RL029	-	27,356	27,595	79	63	inner membrane	Hypothetical protein	C54 / <i>P. aeruginosa</i> C	1E-09 (38)	STY4565	AAN62148
RL030	-	27,592	27,951	19	66	inner membrane	Hypothetical protein	PSPTO0869 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	1E-25 (59)	KAT2270, STY4567	AAQ64104
RL031	-	28,024	28,329	101	57	cytoplasm	Hypothetical protein	No significant similarity		PA4736, PA4737	
RL032	-	28,502	28,881	103	49	outer membrane and periplasm	Hypothetical protein	PSPTO0870 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	1E-22 (49)	XAC0400	
RL033	-	28,810	29,967	385	47	cytoplasm	Hypothetical protein	No significant similarity			
RL034	-	30,093	31,579	493	59	inner membrane	Putative tRNA helicase	PSPTO0870 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	1E-00 (65)	XAC0400	

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Filing Date: September 12, 2003 Serial No.: Not Yet Assigned

Title: VIRRULENCE-ASSOCIATED NUCLEAR ACIDS AND PROTEINS AND USES THEREOF

Applicant(s): Laemmle Rainer et al.

FIGURE 34C

RL035	-	31,590	32,240	216	62	inner membrane	Hypothetical protein	PSPT00880 / <i>P. syringae</i> pv. <i>tomato</i> DC3000	2E-74 (63)	XAC2260, STY4563	AA054414	
RL036	-	32,572	33,567	9	60	inner membrane	Sensor component	ORF272_273 / PAP44 / RSC / <i>Serine/threonine</i> regulatory system component	0.0 (0) / 8-10-12-14-16-18-20-22-24-26-28-30-32-34	STY0370	AAG05292, AAG05293	
RL037	+	35,364	36,563	39	59	cytoplasm	<i>PvrR</i>	regulator of two-component regulatory system; adhesion and antibiotic resistance	PvrR / <i>P. aeruginosa</i> PA14 / <i>VieA</i> / <i>X. campestris</i> pv. <i>campestris</i> ATCC 33913	0.0 (100) / 2E-55 (34)	PvrR	AAM15333 / AAM41975
RL038	-	36,641	39,893	104	59	inner membrane	Sensor component	STY0277 / <i>Serine/threonine</i> regulatory system component	STY0277	STY0277		
RL039	+	39,898	40,593	231	59	cytoplasm	<i>resB</i>	regulator of two-component regulatory system	Z3476 / <i>E. coli</i> O157:H7 EDL933	8E-33 (39)		AAG5752
RL040	-	40,677	41,331	236	67	outer membrane and periplasm	Outer membrane and periplasm	Probable pilin assembly chaperone	PA2130 / <i>P. aeruginosa</i> PAO1	PA2130 (67)	PA2130 (67)	AAG05210
RL041	-	41,343	42,689	448	63	outer membrane and periplasm	<i>cupD4</i>	adhesion and protein secretion	PA2131 / <i>P. aeruginosa</i> PAO1	0.0 (70)	STY0370	AAG05519
RL042	-	42,586	45,288	880	66	outer membrane and periplasm	<i>cupD2</i>	Probable fimbrial biogenesisusher protein adhesion and protein secretion	PA2130 / <i>P. aeruginosa</i> PAO1	0.0 (67)	STY0371	AAG05218
RL043	-	45,282	46,028	248	65	outer membrane and periplasm	<i>cupD2</i>	Probable pilin assembly chaperone / adhesion and protein secretion	PA2129 / <i>P. aeruginosa</i> PAO1	1E-83 (64)	STY0372	AAG05517
RL044	-	46,665	46,925	205	63	outer membrane and periplasm	Probable fimbrial biogenesisusher protein adhesion and protein secretion	PA2128 / <i>P. aeruginosa</i> PAO1	2E-66 (72)	STY0373	(GO:0005616)	
RL045	-	46,836	47,101	pseudogene	55		Recombination	Transposase / <i>E. coli</i> (plasmid p1658/97)	2E-36 (82)		AAG049572	
RL046	-	47,103	47,549	224	61	inner membrane	Hypothetical protein	PSPT00880 / <i>P. aeruginosa</i> PAO1	0.0 (66)	XAC2250, STY4563	AAG049574	
RL047	-	47,849	50,083	741	65	inner membrane	Hypothetical protein	SG68 / <i>P. aeruginosa</i> SG17M	0.0 (66)	XAC2259, STY4562	AAG062290	
RL048	-	50,087	50,101	851	59	cytoplasm	Hypothetical protein	No significant similarity				

FIGURE 34D

RL049	-	50,323	50,823	166	66	outer membrane and periplasm	Hypothetical protein	SG69 / <i>P. aeruginosa</i> SG17M	7E-34 (51)	STV4560	AAN62291
RL050	-	50,320	51,416	251	64	outer membrane and periplasm	Hypothetical protein	SG69 / <i>P. aeruginosa</i> SG17M	5E-28 (6)	STV4559	AAN62290
RL051	-	51,416	52,171	251	65	outer membrane and periplasm	Hypothetical protein	C68 / <i>P. aeruginosa</i> C	5E-50 (52)	STV4558	AAN62162
RL052	-	52,172	52,564	221	66	outer membrane and periplasm	Hypothetical protein	SG69 / <i>P. aeruginosa</i> SG17M	5E-05 (5)	STV4557	AAN62292
RL053	-	53,019	53,235	pseudogene	61	cytoplasm	Recombination	Transposase / <i>P. putida</i> (plasmid pWW53)	7E-09 (54)		BAB59051
RL054	-	53,182	53,193	211	67	cytoplasm	Hypothetical protein	PA2222 / <i>P. aeruginosa</i> PAO1	2E-56 (48)		AAG05610
RL055	+	54,524	55,189	221	50	cytoplasm	Hypothetical protein	PA2224 / <i>P. aeruginosa</i> PAO1	2E-06 (23)		AAG05612
RL056	-	55,721	55,946	221	49	cytoplasm	Hypothetical protein	PA2224 / <i>P. aeruginosa</i> PAO1	2E-06 (23)		AAG05613
RL057	+	56,030	56,275	81	59	cytoplasm	Hypothetical protein	CAC257 / <i>Clostridium acetobutylicum</i>	2E-13 (34)	SG60996	AAN62050
RL058	-	56,348	56,707	151	48	cytoplasm	Hypothetical protein	PA2224 / <i>P. aeruginosa</i> PAO1	2E-13 (34)		AAN62051
RL059	-	56,768	58,303	511	59	cytoplasm	Transposase	PP4439 / ISPpu14 ORF2 / <i>P. putida</i> KT2440	0.0 (90)		AAN70015
RL060	-	58,567	58,702	151	63	cytoplasm	Transposase	PP4438 / ISPpu14 ORF2 / <i>P. putida</i> KT2440	2E-59 (98)		AAN70016
RL061	-	58,753	59,019	88	57	cytoplasm	Transposase	PP4437 / ISPpu14 ORF1 / <i>P. putida</i> KT2440	7E-39 (88)		AAN70013
RL062	-	59,763	60,502	108	46	cytoplasm	Hypothetical protein	XAC2242 / <i>X. axonopodis</i> pv. <i>citri</i> 306	0.0 (69)		
RL063	-	60,826	63,075	749	63	inner membrane	Plasmid-related protein	XAC2243 / <i>X. axonopodis</i> pv. <i>citri</i> 306		AAM37096	
RL064	-	63,180	64,631	183	64	cytoplasm	Hypothetical protein	XAC2242 / <i>X. axonopodis</i> pv. <i>citri</i> 306		AAM37092	
RL065	-	64,661	65,266	201	63	cytoplasm	Hypothetical protein	XAC2241 / <i>X. axonopodis</i> pv. <i>citri</i> 306	1E-54 (56)		AAM37094
RL066	-	65,258	65,612	83	60	cytoplasm	Hypothetical protein	XAC2242 / <i>X. axonopodis</i> pv. <i>citri</i> 306	1E-09 (40)	XAC2240	AAN62050
RL067	-	65,680	66,042	120	58	cytoplasm	Hypothetical protein	C77 / <i>P. aeruginosa</i> C	8E-23 (42)	XAC2239	AAN62171
RL068	-	66,121	66,587	91	63	cytoplasm	Hypothetical protein	XAC2237 / <i>X. fastidiosa</i> 9a5c	3E-50 (53)		
RL069	-	66,384	67,073	229	60	inner membrane	Hypothetical protein	XAC2237 / <i>X. fastidiosa</i> 9a5c	3E-50 (53)		AAF84509

FIGURE 34E

RL070	-	67,011	67,423	16	62	cytoplasm	Hypothetical protein	No significant similarity			
RL071	-	67,663	68,370	235	53	cytoplasm	Hypothetical protein	SG91 / <i>P. aeruginosa</i> SG17M	6E-35 (40)		AAN62312
RL072	-	68,851	69,029	152	52	cytoplasm	Hypothetical protein	STY435 / <i>S. enterica</i> subsp. <i>enterica</i> ser. <i>PhoC</i> 183	7E-11 (64)	XE-123 (227)	CAF0214
RL073	+	69,111	69,377	88	57	cytoplasm	Hypothetical protein	No significant similarity			
RL074	-	69,261	69,665	175	57	cytoplasm	Hypothetical protein	XE-161 / <i>S. enterica</i> subsp. <i>enterica</i> ser. <i>PhoC</i> 183	1E-28 (2)	STY435 / STY454	CAF0214
RL075	-	70,626	71,192	188	58	cytoplasm	Hypothetical protein	No significant similarity			
RL076	-	71,191	71,885	214	60	cytoplasm	Hypothetical protein	No significant similarity			
RL077	-	72,107	72,544	145	68	outer membrane and periplasm	<i>pilM2</i>	Type IV B pilus / adhesion and and protein secretion	5E-04 (21)	PA4199, STY4540	BAB91693
RL078	-	72,523	73,901	144	63	outer membrane and periplasm	<i>pilM2</i>	Type IV B pilus / adhesion and and protein secretion	3E-65 (38)	STY4550, XAC2151, XAC223, XCC2154, PA0396, PA0395	BAB91693
RL079	-	73,906	74,847	313	65	inner membrane	<i>pilT2</i>	Type IV B pilus / adhesive peptidase / adhesion and and protein secretion	8E-25 (27)	STY4546, STY4547, BfpE, STY4548, BfpF / <i>E. coli</i> (plasmid pB171)	BAB91693
RL080	-	74,844	75,174	176	60	outer membrane and periplasm	<i>pilS2</i>	Type IV B pilus / adhesion and and protein secretion	5E-15 (29)	STY4549, BfpE, STY4550, BfpF / <i>S. enterica</i> subsp. <i>enterica</i> (Type II), PA2676, PA3102, STY0164	BAB91688
RL081	-	75,396	76,475	359	55	inner membrane	<i>pilR2</i>	Type IV B pilus / adhesion and and protein secretion	4E-51 (33)	XAC0697, XCC3423 (Type II), PA2676, BAB91688	
RL082	-	76,475	78,055	526	63	outer membrane and periplasm	<i>pilQ2</i>	Type IV B pilus / adhesion and and protein secretion	STY4546, BfpE, STY4547, BfpF / <i>S. enterica</i> subsp. <i>enterica</i> (Type II)	BAB91693	
RL083	-	78,064	78,597	177	69	outer membrane and periplasm	<i>pilP2</i>	Type IV B pilus / adhesion and and protein secretion	1E-06 (34)	STY4544	BAB91690
RL084	-	78,582	79,292	411	64	inner membrane	<i>pilQ2</i>	Type IV B pilus / adhesion and and protein secretion	3E-15 (21)	STY4543	BAB91693

FIGURE 34F

Accession	Category	Length	Start	End	Protein	Location	Annotations	Secretin / Type IV B pilus / adhesion and protein secretion	PilIN / <i>E. coli</i> K-12 (plasmid R721)	6E-84 (35)	bfpB, PA1302 (Type II), XFI527, pefD (general secretion pathway protein)	BAB12647
RL085	-	79,916	81,538	540	63	outmembrane	<i>pilIN2</i>					
RL086	-	81,657	82,711	116	66	outer membrane		Teichoic B pilus adhesion and protein secretion	STY5397/ <i>Stenotrophomonas pilin</i> protein	4E-48 (4)		
RL087	+	83,023	83,349	103	40	inner membrane		Colicin immunity protein	PA0984 / <i>P. aeruginosa</i> PAO1	4E-55 (94)		AAG04373
RL088	-	83,744	84,870	193	74	inner membrane		Colicin-like toxin protein (DyscoinS)	PA0855 / <i>P. aeruginosa</i> PAO1	4E-00 (77)	PA0850	AAQ24234
RL089	-	85,558	87,531	657	64	inner membrane		DNA Helicase	DNA helicase / <i>Dictyostelium discoideum</i> AX14	4E-28 (24)	PA0799	AAQ01158
RL090	-	87,228	89,117	621	60	cytoplasm		Hypothetical protein	No significant similarity			
RL091	-	89,551	90,021	156	44	cytoplasm		Similar to luminal binding protein	Ri01f42 / <i>Rhizobium rhizogenes</i> MAFF01-01724	5E-29 (41)		BAB16261
RL092	-	90,019	92,020	64	62	cytoplasm		Topoisomerase	XF0001 / <i>Xanthomonas</i> sp. 9455	PA0010 / <i>Xanthomonas</i> sp. 9455	PA0010 / <i>Xanthomonas</i> sp. 9455	PA0010 / <i>Xanthomonas</i> sp. 9455
RL093	+	92,340	92,573	77	58	cytoplasm		Hypothetical protein	XE151 (43)	XE151 (43)	XE151 (43)	XE151 (43)
RL094	-	92,412	92,657	181	159	cytoplasm		Hypothetical protein	XCC3755 / <i>Stenotrophomonas piloselloides</i> (pxf5)	XCC3755 / <i>Stenotrophomonas piloselloides</i> (pxf5)	XCC3755 / <i>Stenotrophomonas piloselloides</i> (pxf5)	XCC3755 / <i>Stenotrophomonas piloselloides</i> (pxf5)
RL095	-	93,421	93,891	156	61	cytoplasm	<i>ssb</i>	Single-stranded DNA binding protein	C102 / <i>P. aeruginosa</i> C	6E-32 (53)	XAC2211, PA4232	AAN62318
RL096	-	93,905	94,338	171	60	cytoplasm		Hypothetical protein	XE1770 / <i>Xanthomonas</i> sp. 9455	XE1770 / <i>Xanthomonas</i> sp. 9455	XE1770 / <i>Xanthomonas</i> sp. 9455	XE1770 / <i>Xanthomonas</i> sp. 9455
RL097	-	94,444	95,172	242	63	cytoplasm		Hypothetical protein	ORF6 / <i>Pseudomonas</i> sp. B13	7E-66 (52)	XAC2209, STY4529	CAD60670
RL098	-	95,442	95,681	129	66	inner membrane		Hypothetical protein	No significant similarity			
RL099	-	95,672	95,947	91	60	cytoplasm		Hypothetical protein	No significant similarity			
RL100	-	95,944	97,269	161	60	cytoplasm		Hypothetical protein	ORF5 / <i>Pseudomonas</i> sp. B13	7E-08 (39)	XE2208 / <i>Xanthomonas</i> sp. 9455	CAD60669
RL101	-	97,266	98,033	255	58	cytoplasm		Hypothetical protein	ORF4 / <i>Pseudomonas</i> sp. B13	2E-33 (40)	XF1782, STY4526	CAD60668
RL102	-	98,061	99,800	579	58	cytoplasm		Hypothetical protein	SG1029 / <i>Pseudomonas</i> sp. B13	7E-06 (41)	XE7832 / <i>Xanthomonas</i> sp. 9455	CAD60671
RL103	-	99,797	100,051	84	60	cytoplasm		Hypothetical protein	No significant similarity			
RL104	-	100,048	101,064	338	64	cytoplasm		Hypothetical protein	PA3859 / <i>Pseudomonas</i> sp. B13	7E-00 (96)	STY2465, STY1674, STY2226	CAD60672
RL105	-	101,064	101,297	77	65	cytoplasm		Hypothetical protein	No significant similarity			

FIGURE 34G

RL106	-	101,290	101,284	14	6	Cytoplasm	Hypothetical protein	No significant similarity		
RL107	-	101,777	102,034	85	60	cytoplasm	Hypothetical protein	No significant similarity		
RL108	-	102,031	102,558	155	62	Cytoplasm	Hypothetical protein	No significant similarity		
RL109	-	102,745	104,107	pseudogene	61		<i>dnab</i>	DNA replication and recombination	Replicative DNA helicase DnaB / <i>Pseudomonas</i> sp. SLT2001 (plasmid pQBR55)	E-130 (60)
RL110	-	104,282	104,389	23	60	Cytoplasm	Hypothetical protein	Putative phage FNV0874 / <i>Escherichia coli</i> K-12 substr. W3110 protein	PA4931, STY4442, XAC1477, XF0361, XCC1434	CAD13464
RL111	-	104,986	105,687	233	64	cytoplasm	Hypothetical protein	STY1595 / <i>S. enterica</i> subsp. <i>enterica</i> ser. Typhi CT18	1E-16 (32)	CAD01841
RL112	-	105,687	106,523	22	64	inner membrane	Hypothetical protein	No significant similarity		
RL113	-	106,516	107,013	165	60	outer membrane and periplasm	Hypothetical protein	PA2226 / <i>P. aeruginosa</i> PAO1	2E-32 (47)	AAG05614
RL114	-	107,010	107,690	22	58	Cytoplasm	Hypothetical protein	ORE502 / <i>P. aeruginosa</i> PAO1	2E-25 (35)	AAG05607
RL115	-	107,687	108,616	309	60	inner membrane	<i>soj</i>	Chromosome partitioning	Soj / <i>P. aeruginosa</i> SG17M	XFI785, XAC2205, STY4521
		108,700	108,577	24	58				<i>dnab</i> / <i>P. aeruginosa</i> PAO1	AAG02083

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Alignment: No\_2 - embl|AL039136|HSM003612

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Homo sapiens mRNA; EST DKFZp566K094\_r1 (from clone DKFZp566)

Q: 18 DQTC DNLSQNPPHHLLLRLLDHWGDPAGCWS1GQTYSGHLYLPYCRELHKCS1CAHRNWH SEQ ID NO: 230  
DQTC DNLSQNPPHHLLLRLLDHWGDPAGCWS1GQTYSGHLYLPYCRELHKCS1CAHRNWH SEQ ID NO: 231  
H: 29 DQTC DNLSQNPPHHLLLRLLDHWGDPAGCWS1GQTYSGHLYLPYCRELHKCS1CAHRNWH SEQ ID NO: 232  
  
HYCCLWPVWMILCYMSW 93  
HYCCLWPVWMILCYMSW  
HYCCLWPVWMILCYMSW 256

Figure 35

Alignment: No\_8 - embl|M79137|HSXT01285

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EST01285 Subtracted Hippocampus, Stratagene (cat. #936205) H

Q: 18 QVQHPPCLLDQHQQECIPPCLPPDHLQDPQHPFLLPDHHVPHLVVLIQPQLCRALAP SEQ ID NO: 233  
75 QVQHP .CLLDQHQQECIPPCLPPDHLQDPQHPFLLPDHHVPLVVLIQPQLCRALAP SEQ ID NO: 234  
H: 43 QVQHPXXCLLDQHQQECIPPCLPPDHLQDPQHPFLLPDHHVPLVVLIQPQLCRALAP SEQ ID NO: 235  
216

Figure 36

Alignment: No47 - swissnew|P35555|FBN1\_HUMAN

FIBRILLIN 1 PRECURSOR.//:swiss|P35555|FBN1\_HUMAN FIBRILLIN 1  
PRECURSOR.//:trembl|L13923|HSFIBRLLN\_1 product: "fibrillin"; Homo sapiens fibrillin  
mRNA, complete cds. //:gp|L13923|306746 product: "fibrillin"; Homo sapiens fibrillin mRNA,  
complete cds.

Q: 18 CGGASCHNTLGSYKCMCPAGFQYEQFSGGCQDINECGSAQAPCSYGCSNTTEGGYLCGCPP SEQ ID NO:236  
-- CGGASCHNTLGSYKCMCPAGFQYEQFSGGCQDINECGSAQAPCSYGCSNTTEGGYLCGCPP SEQ ID NO:237  
H: 2617 CGGASCHNTLGSYKCMCPAGFQYEQFSGGCQDINECGSAQAPCSYGCSNTTEGGYLCGCPP SEQ ID NO:238  
GYFRIGQGHCVSGMGMGRGNPEPPVSGEMDDNSLSPEACYECKINGYPKRGKRKRRSTNET SEQ ID NO:236  
GYFRIGQGHCVSGMGMGRGNPEPPVSGEMDDNSLSPEACYECKINGYPKRGKRKRRSTNET SEQ ID NO:237  
GYFRIGQGHCVSGMGMGRGNPEPPVSGEMDDNSLSPEACYECKINGYPKRGKRKRRSTNET SEQ ID NO:238  
DASNIEDQSETEANVSLASWDVEKTAIFAFNISHV-NKVRIL 178 SEQ ID NO:236  
DASNIEDQSETEANVSLASWDVEKTAIFAFNISHV NKVRIL 2778 SEQ ID NO:237  
DASNIEDQSETEANVSLASWDVEKTAIFAFNISHVSNKVRIL 2778 SEQ ID NO:238

Figure 37

Alignment: No56 - trembl|AF088916|AF088916\_1

gene: "EMI"; product: "elastin microfibril interfase located protein"; Homo sapiens elastin microfibril interfase located protein (EMI) gene, complete cds.  
//:trembl|AF088916|AF088916\_1 product: "emilin precursor"; Homo sapiens emilin precursor, mRNA, complete cds and 3' UTR. //:gp|AF088916|5353510 product: "emilin precursor"; Homo sapiens emilin precursor, mRNA, complete cds and 3' UTR.  
//:gpnew|AF162780|6693840 gene: "EMI"; product: "elastin microfibril interfase located protein"; Homo sapiens elastin microfibril interfase located protein (EMI) gene, complete cds.

Q:	7	DGDVYNPSTGVFTAPYDGRYLITATLPERDAYVEAVLSVSNASVAQLHTAGYRREFLEY	SEQ ID NO: 239
		DG..Y:P.TGVFTAP. GRYL: :A.LT .R.. VEAVLS SN..VA: : : .GY. E LE	SEQ ID NO: 240
H:	896	DGGYYDPETGVFTAPLAGRYLLSAVLGHRHEKVEAVLSRSNQGVARVDSGGYEPEGLE-	SEQ ID NO: 241
		HRPPGALHTCAGG-GAFHLLVHLKAGDAV	94 SEQ ID NO: 239
		: :P .. : .. G. G.F.LI: L:AGD.V	983 SEQ ID NO: 240
		NKPVAESQPSPGTTLGVFSLILPLQAGDTV	983 SEQ ID NO: 241

gene: "EMI"; product: "elastin microfibril interfase located protein"; Homo sapiens elastin microfibril interfase located protein (EMI) gene, complete cds.  
//:trembl|AF088916|AF088916\_1 product: "emilin precursor"; Homo sapiens emilin precursor, mRNA, complete cds and 3' UTR. //:gp|AF088916|5353510 product: "emilin precursor"; Homo sapiens emilin precursor, mRNA, complete cds and 3' UTR.  
//:gpnew|AF162780|6693840 gene: "EMI"; product: "elastin microfibril interfase located protein"; Homo sapiens elastin microfibril interfase located protein (EMI) gene, complete cds.

Q:	7	DGDVYNPSTGVFTAPYDGRYLITATLPERDAYVEAVLSVSNASVAQLHTAGYRREFLEY	SEQ ID NO: 242
		DG..Y:P.TGVFTAP. GRYL: :A.LT .R.. VEAVLS SN..VA: : : .GY. E LE	SEQ ID NO: 243
H:	896	DGGYYDPETGVFTAPLAGRYLLSAVLGHRHEKVEAVLSRSNQGVARVDSGGYEPEGLN	SEQ ID NO: 244
		HRPPGALHTCAGG-GAFHLLVHLKAGDAV	94 SEQ ID NO: 242
		: :P .. : .. G. G.F.LI: L:AGD.V	983 SEQ ID NO: 243
		NKPVAESQPSPGTTLGVFSLILPLQAGDTV	983 SEQ ID NO: 244

Alignment: No59 - pironly|A35763|A35763

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unnamed ORF; P.lividus 2-alpha collagen (COLL2-alpha) mRNA, complete cds.  
//:pironly|A35763|A35763 collagen alpha 2 chain - sea urchin (Paracentrotus lividus)  
(fragment)//:gp|J05422|159962 unnamed ORF; P.lividus 2-alpha collagen (COLL2-alpha)  
mRNA, complete cds.

Q:	92 GENGSSGSQAPIQGLRGIFGLWGRRSRARFCGPR-PVARLGGGTSAAGRELGL	142 SEQ ID NO: 245
	GE G.SG...P QG:RGI G: G.... GPR P . GGG S G.. GL	SEQ ID NO: 246
H:	718 GEPGPSCENGGP-QGVRGIPGVVGENGKTGRGGPRGPPGLRGGGGSRGERGGL	768 SEQ ID NO: 247

---

unnamed ORF; P.lividus 2-alpha collagen (COLL2-alpha) mRNA, complete cds.  
//:pironly|A35763|A35763 collagen alpha 2 chain - sea urchin (Paracentrotus lividus)  
(fragment)//:gp|J05422|159962 unnamed ORF; P.lividus 2-alpha collagen (COLL2-alpha)  
mRNA, complete cds.

Q:	92 GENGSSGSQAPIQGLRGIFGLWGRRSRARFCGPR-PVARLGGGTSAAGRELGL	142 SEQ ID NO: 248
	GE G.SG...P QG:RGI G: G.... GPR P . GGG S.G.. GL	SEQ ID NO: 249
H:	718 GEPGPSCENGGP-QGVRGIPGVVGENGKTGRGGPRGPPGLRGGGGSRGERGGL	768 SEQ ID NO: 250

Figure 39

Alignment: No60/63 - swiss|P20062|TCO2\_HUMAN

TRANScobALAMIN II PRECURSOR.//:trembl|M60396|HSTCII\_1 gene: "TCN2"; product:  
"transcobalamin II"; Human transcobalamin II (TCII) mRNA, complete cds.  
//:gp|M60396|339196 gene: "TCN2"; product: "transcobalamin II"; Human transcobalamin II  
(TCII)mRNA, complete cds.

Q: 8 VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMAIRTVREEILKAQTPEGHFGN SEQ ID NO: 251  
VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMAIRTVREEILKAQTPEGHFGN SEQ ID NO: 252  
H: 183 VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMAIRTVREEILKAQTPEGHFGN SEQ ID NO: 253  
VYSTPLALQFLMTSPMPGAEI GTACIKARVALLASLQDGAFQNALMISQLLPVLNHKYI SEQ ID NO: 251  
VYSTPLALQFLMTSPMPGAEI GTACIKARVALLASLQDGAFQNALMISQLLPVLNHKYI SEQ ID NO: 252  
VYSTPLALQFLMTSPMPGAEI GTACIKARVALLASLQDGAFQNALMISQLLPVLNHKYI SEQ ID NO: 253  
DLIFPDCLAPRVMLEPAA 145 SEQ ID NO: 251  
DLIFPDCLAPRVMLEPAA 320 SEQ ID NO: 252  
DLIFPDCLAPRVMLEPAA SEQ ID NO: 253

TRANScobALAMIN II PRECURSOR.//:trembl|M60396|HSTCII\_1 gene: "TCN2"; product:  
"transcobalamin II"; Human transcobalamin II (TCII) mRNA, complete cds.  
//:gp|M60396|339196 gene: "TCN2"; product: "transcobalamin II"; Human transcobalamin II  
(TCII)mRNA, complete cds.

Q: 8 VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMA 47 SEQ ID NO: 254  
VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMA SEQ ID NO: 255  
H: 183 VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMA 222 SEQ ID NO: 256

TRANScobALAMIN II PRECURSOR.//:trembl|M60396|HSTCII\_1 gene: "TCN2"; product:  
"transcobalamin II"; Human transcobalamin II (TCII) mRNA, complete cds.  
//:gp|M60396|339196 gene: "TCN2"; product: "transcobalamin II"; Human transcobalamin II  
(TCII)mRNA, complete cds.

Q: 8 VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMA 47 SEQ ID NO: 257  
VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMA SEQ ID NO: 258  
H: 183 VEPFHQGHHSVDTAAMAGLAFTCLKRSNFPNGRRQRITMA 222 SEQ ID NO: 259

Alignment: No65 - swissnew|P23142|FBL1\_HUMAN

FIBULIN-1 PRECURSOR //:swiss|P37888|FBLD\_HUMAN FIBULIN-1, ISOFORM D  
PRECURSOR //:trembl|U01244|HS2444\_1 product: "fibulin-1D"; Homo sapiens fibulin-1D  
mRNA, complete cds. //:gp|U01244|1621019 product: "fibulin-1D"; Homo sapiens fibulin-1D  
mRNA, complete cds.

Q: 18 RNCQDIDECVTGJHNCSINETCFNIQGGFRCLAFEC PENYRSAATLQQEKTDTVRCI KS SEQ ID NO: 260  
RNCQDIDECVTGJHNCSINETCFNIQG.FRCLAFEC PENYRSAATLQQEKTDTVRCI KS SEQ ID NO: 261  
H: 521 RNCQDIDECVTGJHNCSINETCFNIQGAFRCLAFEC PENYRSAATLQQEKTDTVRCI KS SEQ ID NO: 262  
CRPNDVTCVFDPVHTISHTV1SLPTFREFTRPEEIIIFLRAITPPHPASQANIIFDITEGN SEQ ID NO: 260  
CRPNDVTCVFDPVHTISHTV1SLPTFREFTRPEEIIIFLRAITPPHPASQANIIFDITEGN SEQ ID NO: 261  
CRPNDVTCVFDPVHTISHTV1SLPTFREFTRPEEIIIFLRAITPPHPASQANIIFDITEGN SEQ ID NO: 262  
LRDSFDIIKRYMDGMTVGIRR 158 SEQ ID NO: 260  
LRDSFDIIKRYMDGMTVG: R 661 SEQ ID NO: 261  
LRDSFDIIKRYMDGMTGVVR 661 SEQ ID NO: 262

Figure 41

Alignment: 80 - trembl|AF045447|AF045447\_1

gene: "DPC4"; product: "deleted in pancreatic carcinoma"; Homo sapiens deleted in pancreatic carcinoma (DPC4) gene, exon 11 partial sequence and complete cds.  
//:trembl|U44378|HS443781\_1 gene: "DPC4"; product: "Dpc4"; Human homozygous deletion target in pancreatic carcinoma (DPC4) mRNA, complete cds. //:pironly|S71811|S71811 probable transcription regulator MAD-4 - human//:gp|AF045447|2865657 gene: "DPC4"; product: "deleted in-pancreatic carcinoma"; Homo sapiens deleted in pancreatic carcinoma (DPC4) gene, exon 11 partial sequence and complete cds. //:gp|U44378|1163234 gene: "DPC4"; product: "Dpc4"; Human homozygous deletion target in pancreatic carcinoma (DPC4) mRNA, complete cds.

Q: 6 PGSRIRGRVDTLQXNAPXXMMVKDEYVHDFEGQPLXTEGHXIQTIQHPPXNRAXTETYX SEQ ID NO: 263  
PG :.G TLQ.NAP..MMVKDEYVHDFEGQP.L.TEGH.IQTIQHPP.NRA.TETY. SEQ ID NO: 264  
H: 139 PGIDLSGL--TLQSNAPSSMMVKDEYVHDFEGQPSLSTEGHSIQTIQHPPSNRASTETYS SEQ ID NO: 265  
TPALLAPXEXNATXTANFPNIPVAXTXQPAIXLGGXHXEGLLQIAKGPGQPGQQQNGFTGQ SEQ ID NO: 263  
TPALLAP.E.NAT.TANFPNIPVA.T.QPA.1LGG.H.EGLLQIA.GPQPGQQQNGFTGQ SEQ ID NO: 264  
TPALLAPSESNATSTANFPNIPVASTSQPASILGGSHSEGLLQIAASGPQPGQQQNGFTGQ SEQ ID NO: 265  
PATYHHNXTTWTGXRTAPYTPNLPHHQKG 155 SEQ ID NO: 263  
PATYHHN.TTTWTG.RTAPYTPNLPHHQ.G SEQ ID NO: 264  
PATYHHNSTTWTGSRTAPYTPNLPHHQNG 286 SEQ ID NO: 265

Figure 42

Alignment: No86 - trembl|D32210|D32210\_1

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gene: "Notch2"; product: "cell surface protein"; *Mus musculus* (Notch2) mRNA, complete cds.  
//gp|D32210|2373395 gene: "Notch2"; product: "cell surface protein"; *Mus musculus* (Notch2) mRNA, complete cds.

Q: 81 MPALRPALLWALLALWLCCATPAHALQCRDGYEPCVNEGMCVTYHNGTGYCKCP-GFLGE SEQ ID NO: 266  
MP LRPA.L ALL LWLC A PAHALQCR.G.EPCVNEG.CVTYHNGTG:C:CP GFLGE SEQ ID NO: 267  
H: 1 MPDLRPAALRALLWLWLCGAGPAHALQCRGGQEPVCNEGTCVTYHNGTGFRCRCPEGFLGE SEQ ID NO: 268  
YCQHR-PCEKNRCGDPSTC 157 SEQ ID NO: 266  
YCQHR PCEKNRC : .TC 79 SEQ ID NO: 267  
YCQHRDPCEKNRCQNGGTC 79 SEQ ID NO: 268

Figure 43

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
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AATTGGCGGGCCGGTGGACGACCAAAACCTGTGATAACCTGTCCTAAACCCCTCCATCATCTACTCCTTCGTCT 75 SEQ ID NO: 109

adaptor

IRGRVDDDOTCDNLSSONPPPHHLLLRL 269 SEQ ID NO: 269

TCTGGATCACTGGGGTGTCTGGCTGGTGGAGCTGGGGCAAACCTACTCTGGCACCTATATCTCCCTTA 150

LDHWGDPAGCWSLGDOTYSGHLYLPY

TTGCCGAGAACTCCACAAATGCTCCCTATGTGCTCATCGGAACCTGGCACCACTATTGTTGTCTTGGCCTGTTG 225

CRELHKCSLCAHARNWHHHYCCCLWPVW

GATGCTTGTACATGTCGTGGTAGCCCATGGATGCTGAAACTGTATGCCATGTTCTGTCCTGGTGTCCCTGG 300

MLCYMSW.PMDAETVCHVSVPGVPG 375

CTGAGCTCGTAGCTGGCATTTCAGGGTTGTTGCTCATGAGATCAAGGACACCTTCTGAGGACTTACACGG 450

ARSWHFDRVCVSS.DOGHLPEDLHG

ACGCTATGAGACTTACAATGGCAATGATGAGAGGGAGGGAGCTGGACCATGTCAGCGCAGCCTGAGCTGCT

RYADLOWO.EEPGSGPCTAAOPELL

GTGGTGTGAGAACTACACCAACTGGAGCACCAGCCCTACTTCTGGAGCATGGC 506

WCAELHOLEHOPLLPGAW

Figure 44

-----  
AATTTCGGCGGCCGGCGTCGACCAAGTGCAACACCCCTCCACTGTGCCTTTGGACCAGCACCAACAGGAATGTATCCC  
75 SEQ ID NO: 110

adaptor  
I R G R V D O V O H P P L C L L D O H O O E C I P  
150 SEQ ID NO: 270

TCCGTGCCCTCCCACCGGACCACCTCCAGGACCCCCAGCACCCCTTCTCTTCCGGACCATCATGTCCCCCACCT  
150

P C L P P D H L O D P O H P F L L P D H H V P H L  
225

GGTGGTCCCTATCCAGCCCCAACCTGTGCCGGGCCCTGGCCCCACAGGGCCATATGCTACACCAAATATGCCCTT  
225

V V L I O P O L C R A L A P O G H I L H O I C P F  
300

CCAGAGCTACCCANACCATATGGTGCACCCACAGATCCAGCTGCAGCTGGTCCCTTAGGTCCATGGGGATCCATG  
300

OSYP?HMVHPOIOLOLVL. V H G D P C  
375

TCTTCTGGACCTGGGCGCCAGGAATGGGAGGGCAGTATCCTACCCCTAATATGCCATATCCATCTCCAGGCCA  
375

LLDLGROEWEGSILPLICHIHLOAH  
450

TATCCCGNTCTCTCTCCCCAAGCCCCCTGGGCAGCACCCACCTGTCCATGGGCACCGTCCACCAAGGAGCC  
450

IP?LLLPLKPLGOGHHHLFHFHGAPEFHOEPE  
519

TGGGGACCAAGCACCATATCCTGCCCTACAGGATCGTATCCCACACCAGGACTCTATCCTACTCCC  
519

G D H O H H I L P L O D R I P H O D S I L L P  
-----

Figure 45

AATTGCAGCCGCGTGACTGCGGAGGAGCTCCCTGTCACAAACACCCGGGGAGCTACAAGTGATGTGTCCCAGC  
75 SEQ ID NO: 111

adaptor

I R G R V D C G G A S C H N T L G S Y K C M C P A  
150 SEQ ID NO: 271

CGGCTTCCAGTATGAACAGTTAGTGGAGGATGCCAAGACATCAATGAATGTTGGCTCTGCCAGGGCCCCCTGCAG  
150

G F O Y E O F S G G C O D I N E C G S A O A P C S

CTATGGCTGTCCAATACCGAGGGGGTACCTGTGTTGGCTGTCCACCTGGTTACTTCCGCATAGGCCAAGGGCA  
225

Y G C S N T E G G Y L C G C P P G Y F R I G O G H

CTGTGTTCTGGAATGGGATGGGGAGGAAACCCAGAGCCACCTGTCAAGTGGTGAATGGATGACAATTCACT  
300

C V S G M G M G R G N P E P P V S G E M D D N S L

CTCCCCAGAGGCTTGTTACGAGTGTAAAGATCAATGGCTACCCAAACGGGGAGGAAACGGAGAACACAAACGA  
375

S P E A C Y E C K I N G Y P K R G R K R R S T N E

AACATGATGCCTCAATATCGAGGATCAGTCTGAGACAGAACGCAATGIGAGTCTTGCAAGTTGGATGTTGAGAA  
450

T D A S N I E D O S E T E A N V S L A S W D V E K

GACAGCCATCTTGTCTTCAATATTCACGTCAAGTAAACAGGTTGAACTCTANAACTCCTT  
514

T A I F A F N I S H V S N K V R I L ? L L

Figure 46

AATTGCCGCCGCGTCGACGGGGATGTTACAACCCAGCACCGGGTCTTCACGGCTCTTATGATGGCGCTA 75 SEQ ID NO: 112

adaptor

I R G R V D G D V Y N P S T G V F T A P Y D G R Y 140 SEQ ID NO: 272

CCTGATCACGGCCACCCCTACCCCCGGAGAGAGACGCTACGTGGAAGCAGTGCTGTCGGCTCCAACGCCAGCAG 150

L I T A T L T P E R D A Y V E A V L S V S N A S S 175

TGGCCCACTGCATACCGCTGGGTACAGGAGAGAGTTCTGGAAATACCAACCGCCCTCCAGGAGCTTGATACCT 225

G P A A Y R W V O E R V P G I P P P S R S F A Y L 250

GCGGGGGCCCGGGGCATTCCACCTCATCGTCACCTGAAGGCGGAGATGCAGTCAACGTGTTGACTGGGG 300

R G P G G I P P H R A P E G G R C S O R R G D W G 325

GCAAGCTGGCTCACACAGACTTGTGAAATGTACTCCACATTAGTGGGTTCTTATATCCTTCCCTTCCC 375

0 A G S H R L . . N V L H I . W G F L I S F P F P 400

ACCTCTAAGGTGGCTGGGGAGATGT 400

P L R W L G R C 425

Figure 47

AATTCGGGGCGCGTGCACAAAGAAAAAGAAAGTTTCACTCTGGCTGTGGAACATTTCAAGGACTCCCTGA

75 SEQ ID NO: 113

adaptor

I R G R V D K E K K K V F T L G C G T I S G L P E

SEQ ID NO: 273

GGGGTTTCTCTGGAGCTTCTGAGTTTCTCTGGACATTGTCTCCAGGTECCAGGCGAGGCAGGGTGGC

150

G F P L E L P E F P P G H F V S R S O R O A G Y A

TCCCCGGAAGGGCTGTGGGTGCCACCCCTGGCTGACTGCAGCCCTCTTGACCTCTCCGGCCATCACCCGCA

225

P G R A V G A T L A D C S P L L H L L P A I H P O

GGAGGTCTTCCCCCAGCACTGGCTTGAGGGAGCTCCCTCTGCCCCGGAGAAATGGCTCTCCGGTCACAGGC

300

E V F P O H W L V R S S L C P G E N G S S G S O A

TCCCCCTCAGGGACTGAGGGCATTGGATTGTGGGAAGGGCTCCAGGGCCGGTCTGIGGCCAGGCC

375

P L O G L R G I F G L W G R R S R A R F C G P R P

TGTTGCTCGGCTGGTGGAGGACCTCTGCAGGGGGAGCTGGCTTTGAACACCT

433

V A R L G G G T S A G R E L G L . T P

Figure 48

AATT CGCGGCGCGT GACGGGATGTTACAACCCAGCACGGGTCTCACGGCTCTTATGATGGCGCTA 75

SEQ ID NO: 114

adaptor

I R G R V D G D V Y N P S T G V F T A P Y D G R Y

SEQ ID NO: 274

CCTGATCACGGCACCCCTCACCCCCGAGAGAGACGCCACGTGGAACGAGTGCCTGTCGGCTCCAACGCCAGCAG

150

L I T A T L T P E R D A Y V E A V L S V S N A S S

TGGCC CAGCTGCATAACCGCTGGGTACAGGAGAGAGTCTGGAAATACCAACCGCCCTCCAGGAGCTTGCTACCT

225

G P A A Y R W V O E R V P G I P P P S R S F A Y L

G G G G G G C C G G G G C A T T C A C C T C A T C G T G C A C C T G A A G G E G G G A G A T G C A G T C A A C G T C G T G G T G A C T G G G G

300

R G P G G I P P H R A P E G G R C S O R R G D W G

GCAAGCTGGCTCACACAGACTTGTATGAAATGTACTCCACATTTAGTGGGTTTCTTATATCCTTCCCTCC

375

→ D A G S H R L . . N V L H I . W G F L I S F P F P

ACCTCTAAGGTGGCTGGGAGATGT

400

→ P L R W L G R C

Figure 49

AATTCGGGGCGCGTCGACCGCAACTGTCAGACATTGATGAGTGTTGACTGGCATCCACAACTGCTCCATCAA  
75

adaptor

SEQ ID NO: 115

I R G R V D R N C O D I D E C V T G I H N C S I N  
150

CGAGACCTGCTTCAACATCCAGGGCGGCTTCCGCTGCCCTGGCTTGAGTGCCTGAGAACTACCGCCGCTCCGC  
150

E T C F N I O G G F R C L A F E C P E N Y R R S A  
225

AGCCACGCTCCAGCAGGAGAACAGACAGACGGTCCGCTGCATCAAGTCCCTGCCGCCAACGATGTCACATGCGT  
225

A T L O O E K T D T V R C I K S C R P N D V T C V  
300

GTTCGACCCCGTGCACACCATCTCCACACCGTCATCTCGCTGCCACCTTCCGGAGTTCAACCGCCCTGAAGA  
300

F D P V H T I S H T V I S L P T F R E F T R P E E  
375

GATCATCTTCCCTCGGGCCATCACGCCACCGCATCCCTGCCAGCCAGGCTAACATCATCTTCGACATCACGGAGG  
375

I I F L R A I T P P H P A S O A N I I F D I T E G  
450

GAACCTGCGGGACTCTTTGACATCATCAAGCGTTACATGGACGGCATGACCGTGGGTGTCGTGCGCCAGGTGCG  
450

N L R D S F D I I K R Y M D G M T V G V V R O V R  
506

GCCCCATCGTGGGCCATTTCAAGCCGTCTGAAGCTGGAGATGAACATGTCGGTCG  
506

P I V G P F H A V L K L E M N Y V V

Figure 50

AATTCGGGGCCGCCTGACACACTGCAGAGTAATGCTCCATCAAGTATGATGGTGAAGGATGAATATGTGCATGA  
75

adaptor

I R G R V D T L O S N A P S S M M V K D E Y V H D

SEQ ID NO: 276

CTTGAGGGACAGCCATCGTTGTCCTGAAGGACATTCAATTCAAACCATCCAGCATCCACCAAGTAATCGTC  
150

F E G O P S L S T E G H S I O T I O H P P S N R A

ATCGACAGAGACATACAGCACCCAGCTCTGTTAGCCCCATCTGAGTCTAATGCTACCAAGCACTGCCAACTTCC  
225

S T E T Y S T P A L L A P S E S N A T S T A N F P

CAACATTCTGTGGCTTCACAAGTCAGCCTGCCAGTATACTGGGGGGCAGCCATAGTGAAGGACTGTTGCAGAT  
300

N I P V A S T S O P A S I L G G S H S E G L L O I

AGCATCAGGGCCTAGCCAGGACAGCAGCAGAATGGATTACTGGTCAGCCAGCTACTTACCATCATAACAGCAC  
375

A S G P O P G O O O N G F T G O P A T Y H H N S T

TACCACTGGACTGGAAGTAGGACTGCACCATACACACCTAATTGCCCTACCAACCAAAA  
435

T T W T G S R T A P Y T P N L P H H O K

SEQ ID NO: 116

SEQ ID NO: 276

150

225

300

375

435

Figure 51

AATT CGGGCCGCGTCGACCGGGGGGGAGGAGCGGACTCCGGGGGGGGAGTCGAGGCATTGCGCCTGG 75  
TTAAGCGCCGGCGCAGCTGGCCGGCTCCCGCCCTGAGGCCCCGGCCCCCTCAGCTCCGTAAACCGCGGACC  
adaptor

SEQ ID NO: 117  
SEQ ID NO: 118

I R G R V D R R P R S G G L R A R G V E A F A P G  
150

GCTTCGGAGCGTAGCGCCAGGGCTTGAGCCTTGAAGCAGGAGGGAGGAGAGATGGGGCTCTATCGG  
CGAACGCTCGCATCGGGCCCCGGACTCGGAAACTTCGTCCTCCCTCCCTCTCACCCCGAGGGAGATAAGCC  
L R S V A P G P E P L K O E E G R R E W G S S I G  
225

GACCCCCCTCCCCATGTGGATCTGCCAGGCGGCGGCGGAGGAGGCGACCGAGAAGATGCCCGCCCTGCGCCC  
CTGGGGGAGGGGTACACCTAGACGGGTCCGCCGCCCTCCCGCTGGCTCTCTACGGGGGGGACCGGGG  
T P S P C G S A O A A A A A E E A T E K M P A L R P  
300

CGCTCTGCTGTGGGGCGCTGCTGGCGCTCTGGCTGTGCTGCGCGACCCCCCGCGCATGCATTGCAGTGTGAGATGG  
GCGAGACGACACCGCGACGACCGAGACCGACACGACGCGCTGGGGCGCGTACGTAACGTCACAGCTCTACC  
A L L W A L L A L W L C C A T P A H A L O C R D G  
375

CTATGAACCCCTGTAAATGAAGGAATGTGTGTTACCTACCAATGGCACAGGATACTGCAAATGTCCANAAGG  
GATACTGGGACACATTTACTTCCTACACACAATGGATGGTGTACCGTGTCTATGACGTTACAGGTNTTCC  
Y E P C V N E G M C V T Y H N G T G Y C K C P ? G  
427

CTTCTTGGGGAAATTGTCAACATCGANACCCCTGTGAGAAGAACCGCTGC  
GAAGAACCCCTTATAACAGTTGTAGCTNTGGGACACTCTTGGCGACG  
F L G E Y C O H R ? P C E K N R C

Figure 52

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF

Applicants: Laurence Rahme et al.

Filing Date: September 12, 2003 Serial No.: Not Yet Assigned

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Pathogenicity Island Probe # (bp # )	<i>P. aeruginosa</i> strains that gave Positive signal with the specific probe used	<i>P. aeruginosa</i> strains that gave Negative signal with the specific probe used
3 (25562-26456)	PA14, CF2, CF6, CF26, CF29	PAO1, PAK, CF1, CF3, CF4, CF5, CF27, CF28, CF30, CF32
4 (61181-63607)	PA14, CF2, CF6, CF26, CF29	PAO1, PAK, CF1, CF3, CF4, CF5, CF27, CF28, CF30, CF32
5 (74933-76117)	PA14, PAO37, CF2, CF6, CF26	PAO1, PAK, CF1, CF3, CF4, CF5, CF27, CF28, CF29, CF30, CF32
6 (84922-86622)	PAO1, PA14, PAO37, CF2, CF, CF26,	PAK, CF1, CF3, CF4, CF5, CF27, CF28, CF29, CF30, CF32
7 (103070-104556)	PA14, PAO37, CF2, CF6, CF26	PAO1, PAK, CF1, CF3, CF4, CF5, CF27, CF28, CF29, CF30, CF32
8 (104799-105545)	PA14, CF2, CF6, CF26	PAO1, PAK, CF1, CF3, CF4, CF5, CF27, CF28, CF29, CF30, CF32

These experiments indicate that at least part of the big island region contained in each probe is present in the *P. aeruginosa* strains that gave positive hybridization signal.

Figure 53

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
Applicants: Laurence Rahme et al.  
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ORF7 Protein SEQ ID NO: 278

MINSHLLYRLSYRGTSFFQPWTLPVLLDSRLRGAPFYGCACQPSDPKSFSSFSTS DKTALPLHAAALSRLPDAHEKAP  
PKRGFPCPPP KRSGEDDLVAFHLRDTGTRREFAGQDQLRQRVLDPLQRA C AIDRVEADGNQLVQRLLAQFQAQL  
ALGQALAQATELDLGDAGDLLASQRLEHHHFVDPVDEFRT EVR IDRVHHCGTLRLAVAGQQLLDLRRTEVGGHHHGVAEV  
HRT PVTVGQASVLEHLEENVEYIRMGLLHLVQQHHRVGLAADRLGQVA AFLEADVARRRADQAGHRVFLHELGHIYPHQR  
LLGIEEEELGQRLAQLGLAHPGRAEEERAARPVRI GEAGARTAHGVGHGDYRIVLADHSPMQLLLHAQQLLALALEHLRH  
RDTGPLGNHFGDFLVGHLVAQQQLVGLGAVLVDHLQAAFQVRDGLVLDARH ALEVALAPRRLHLLLGLLDLRLRALHL  
GLLGLPDLL EVGVFALELDDILLQLGQALPGGFVVFL LQRLALDLQDQATVETIQFLRLGVDLHADAAGGLVDQVDGLV  
RQLPIGDVA VRQLGRGDDRAVGD AHPVVFIAFLEATEDGDGVFLARFVHQHLEAALQRC ILLDV LAI LVEGSSTD AVQ  
LAARQSRLEHVAGVHGTFRLAGADHG VQFVDEQDDPA FLLAQFVEDRLQAFLEAAELGTGDQRP HVQGQQALV LEAVRH  
FAVDDALGQALDDGG LADAGFADQH RVV LGPPLQDLDGPADLVVATDHR VELAFLGALGHVDGV LVQRLARLLD VRV VHR  
FAATQVGHG I LQRLARHALAEQQLAEPGV LVRGQQYQLAGDELVAL LLGQAVSLVEQACEILGQVHVAGR ALDLRQRV E  
FFVEAAAQGGDIEADLHQ QGLDRTALL LEQGGKQVHRLDGRMV MANGQGLGVGERQLQLAGQTVYSHGSSFLL.

Figure 54

ORF7 nucleotide sequence SEQ ID NO: 119

ATGATTAACAGTCATTCGCTTACCGACTGAGCTATCGCGAACGTCTTCTTCAACCCGAGCCTCCGGTGTGCT  
GGATTCGCGTCTCAGAGGCGGCCATTTACGGATGCGCGGGCATGTCAACCCCTGATCCAAAAGTTTTCTTCTT  
TTTCCACGAGGACAAAACGGCCCTTCCACTGCATGCGCAGCGCTCTCGCGCTACCGGACGCCATGAAAAGCCCCG  
CCGAAGCGGGCTTCCCTGTCGCCCGAAGAGGTCAAGCGAAGACGATCTCGCGCTTCCACCTTCGCCAGAGATAC  
TGGCACCCGGCGCAATTGCGGCCAGGATCAGTTGCGCCAGCGGGTTCTGATCCAGCGCTGGATGGCCGCTTCAGC  
GGCGTGCGCCATAGACCGGGTCAAGCCGACGGCAATCAGCTTGTCCAGCGCCTCTGGCTCAGTTCCAGGCTCAGCTC  
GCCGCTGCCAGCGCTTGCAGGCCAGCGACCGAGCTGGATCTCGCGATGCCGGATCTGCTCGCAGGCCAGCGCTCGA  
ACACCACCACTCGATCCGGTTGATGAATTCCGGACGGAAGTGCCTGACCGCCTGACCGCAGGTTGGAGGTCA  
GCCTCGCGTCCGGCCAGCTCTGGATCTGCGCCAGCGGGATCCGGCTCAGGACACCTGGAGGAGAATGTTGA  
CACCGTACGCCGTGACTGCGTCAAGCGCTCGGCTCAGGACACCTGGAGGAGAATGTTGA  
TCTCCACCTCGTCCAGCAGCACCCAGTAGGGCTTGCCTCGGCTCAGGTA  
ACGTAGCCCGAGGCGCCGATCAGGCCGACCGAGTGGTCTCCATGA  
CTCTCGGTATCGAAGAGGAACTCGGCCAG  
CGCCTTGACAACACTCGGTCTTGCACCCGGTCGGGCCAGGAACAGGAACGAGCCGCTCGGCCGGTTCGGATCGCGA  
GGCCGGCGCGCAACGGCGACGGCGTTGGACACGGCGACTACCGCTCGTCTGGCGATCTCGCCGATGCAGCTCC  
TGCTCCATGCGCAGCAGCTCTCGCGCTCGCCCTCGAGCATCTCGACACCGGGATACCGGTCCACTTGGAAACCAC  
GGCGATTTCCTCGTCGGTCACTTGTGCGCAGCACTGGTTCTCGGTCTGGTCA  
GTTCAGGTCTGGATGGTCTGGTACTGGATGGEG  
TGCTTGGCCTGTCGATCTCTGCTGGATCTCGCGCCAGGCCCTGCACCTCGGCCCTCTGGACTTCCAGATCTCTCGAG  
GTCGGCGTATTGCGCTCGAGCTCAGGATATCCTCCTCAGCTTGGCCAGGGCGCTTCTGGTGGCTTCGTCGTTCT  
TCTCAGCGCCTCGCGCTCGATCTTCAGCTGGATCAGGCGACGGTCGAGACGATCCAGTTCTCCGGCTTGGAGTCGATC  
TCCATCGGGATGCGGCTGGCGCTCGTCGATCAGGTCGATGGCCTGTCGGCAGTTGCCGATCGGTGATGTCGGTG  
CGACAGCTGGCGCGCGATGATCGGCCGCTGGTGA  
GGAGGATGGCGATGGTGTCTTCTCGCTGGTCA  
TCGATGTA  
GTTGCCGGCGTCCATGGCACCTTCCGCTT  
GCCGGCGCCGACCATGGTGTGCA  
CCTTCAGGGCGTCTCGAAC  
TCCCTGAGGCCGTCGGCA  
TTCGCCATCGCAGCG  
TCACCGGGTCGAGCTG  
ACGTTCGGGTCGTT  
GAGCAGCG  
TCTGCTGGCCAG  
ATCTCGCGT  
CTTGATCGA  
CCAGGGACT  
AG

Figure 55

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
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clpB protein SEQ ID NO: 279

MRIDRLTSKLQLALSDAQSLAVGHDHPAIEPVHLLSALLEQQGGSIKPLLMQVGFIDIAALRSGLNKELDALPKIQSPTGD  
VNLSQDLARLLNQADRLAQOKGDQFISSELVLLAAMDENTRLGKLLLQGVSRKALENAVANLRGGEAVNDPNVEESRQA  
LDKYTVDMTKRAEEGKLDPVIGRDDEIRRTIQVLQRRTKNNPVLIGEPGVGKTAIVEGLAQRIINGEVPDGLDKRLLAL  
DMGALIAGAKFRGEFEERLKAVLNELGKQEGRVLVIFIDEIHTMVGAGKAEGAMDAGNMLKPALARGEELHCVGATTLDEYR  
QYIEKDAALERRFQKVVLVDEPSEEDTIAILRGALKERYEVHHGVSITDGAIIAAAKLSHRYITDRQLPDKAIDLIDEAASR  
IRMEIDSKPEELDRLDRLIQLKIEREALKEDDEATRKRLAKLEEDIVKLEREYADLEEIWKSEKAEVQGSAQIQQKIE  
QAKQEMEAARRKGDLQESMARIQYQTIPDLERSLQMVDQHGKTENQLLRNKVTDEEIAEVVSKWTGIPVSKMLEGEREKLL  
RMEQELHRRVIGQDEAVVAVSNAVRSSRAGLADPNRPGSFLFLGPTGVGKTELCKALAEFLFDTEEALVRIDMSEFMEK  
HSVARLIGAPPGYVGFEEGGYLTEAIRRKPYSVVLLDEVEKAHPDVFNILLQVLEDGRLTSHGRTVDFRNTVVVMTSNI  
GSAQIQELAGDREAQRAAVMDAVNAHFRPEFINRIDEVVVFEPLAREQIAGIAEIQLGRLRKRLAERELSLELSQEALDK  
LIAVGFDPVY GARPLKRAIQRWIENPLAQLILAGKFAPGASISAKVEGDEIVFA.

Figure 56

clpB DNA SEQ ID NO: 120

ATGCGAATAGACCGTTGACCAGCAAGCTGCAACTGGCGCTCTCGACGCCAGTCCCTGGCGTGGCCATGACCATCC  
GGCCATCGAGCCGGTGCACCTGCTTCCGCCCTGCTGAGCAGCAAGGCCAGTCAAGGCCCTGCTGATGCAGGGTC  
GCTTCGATATCGCCGCCCTGCGCAGGCCCTCAACAAAGAACTCGACGCCGCTGCCAAGATCCAGAGGCCGACCGGGC  
GTGAACCTGTCCCAGGATCTCGCACGCCGCTCAACCAGGCTGACCGCCAGCAGAAGGGCGACAGTTCATCTC  
CAGCGAGCTGGTATTGCTGGCCGAGTGGACGAGAACACCAGGCTGCCAGCTGCTGCTGCCAGGGCGTGTGCC  
AGGGCTGGAGAATGCCGTGGCAACCTGCGTGGCGAGCAGCTGAAAGCAGGCCAACGTCGAGGAGTCGCCAGGCC  
CTGGACAAGTACACCGTCGACATGACCAAGCGCCGAGGAAGGCAAGCTCGACCCGGTGTATCGGTGCGACGAGAT  
CCGCCGGACCATCCAGGTCTGCAGCGGGACCAAGAACAAACCCGGTGTATCGGTGCGACGAGATGCC  
CCATCGTCGAGGGCTGGCCAGGCCATCATCAACGGCAAGTGCCTGGCGACGCCCTCAAGGACAAGGCCCTGCTGCC  
GACATGGGGCGCTGATCGGGTGTGCAAGTTCGCGGGAGTTGGAGGAACGCTGATGGCGAACCCGGTGTGGCAAG  
CAAGCAGGAAGGCCGGTCATCTGTTCATGACGAACTGCACACCATGGTGGCGCCGGCAAGGCGGAAGGTGCCATGG  
ACGCCGGAACATGCTCAAGCCGGCTGGCGCGAGCTGCACTGCGTGGTGTACTACCCCTGACGAGTATCGC  
CAGTACATCGAGAAGGATGCCGCGCTGGAG  
CGCCGCTCCAGAAGGTGCTGGTGGACGAAACCGAGCGAGGAAGACACCATGCCATCCTCCGTGGCCTCAAGGAACGCTA  
TGAAGTGCACCAACGGGGTGAGCATACCGACGGCGCATCGCCGCCAGCTGTCGCCACCGCTACATCACCAGTC  
GGCAACTGCCGACAAGGCCATCGACCTGATCGACGAGGCCGAGCCATCCGATGGAGATCGACTCCAAGGCC  
GAACCTGGATCGTCTCGACCGTCGCCGTATCCAGCTGAAAGATCGAGCGCAGGCCCTGAAAGAAGGAAGGAC  
GAGCGACAGCTGGCCAAGCTGGAGGAGGATATCGTCAAGCTCGAGCGCAATACGCCACCTCGAGGAGATCTGG  
CCGAGAAGGCCGAGGTGCAAGGCCGAGATCCAGCAGAAGATCGAGCAGGCCAAGCAGGAGATGGAGGCC  
CGCAAGGGCACCTCGAGAGCATGGCGCATCCAGTACCAAGACCATCCGGACCTGGAACCGCAGGCC  
CCAGCACGGCAAGACCGAGAACCATGGTGTGCAACAAAGGTGACGCCAGGAAATGCCGAAGTGGTTCAAGTGG  
CCGGTATCCGGTGTGAAAGATGCTCGAGGGCGAGCGCAGAAGCTGCTGCGCATGGAGCAGGAGCTGCA  
ATCGGCCAGGACGAGGCCGTAGTCGCCGTGTCACGCCGTGCCGGCTCGCCGATCCGAACCGGCC  
GAGCGCTGTTCTCTCCCTGGCCGACCGGGGTGGCAAGACCGAGTTGTGCAAGGCCGTGGCCAGTTCTCTCG  
ATACCGAGGAGGCCGTGGAGATAGATATGTCGAGTTCATGGAGAAACACTCGGTGGCCGCTGATCGGCC  
CCGGGCTACGTCGGCTTGAGGAAGGCC  
TACCTGACCGAGGCCATCCGCCAAGCCCTACTCGGTGGTGTGCTGGACGAGGTGGAGAAGGCC  
CAACATTCTCTCCAGGTGCTCGAGGACGCCCTGACCGACAGTCACGGCGTACGGTGGACTTCGCAACACCGTGG  
TGGTGTGACCTCCAACCTCGGTTGGCGCAGATCCAGGAGCTGGCCGGCAGCGCAGGCC  
GACGCCGGTCAATGCGCAGTCGCCGTGCCGAATTCAACCGGATCGACGAAGTGGTGGTGTGAGGCC  
GCAGATGCCGGCATGCCGAGATCCAGCTGGTGCCTGCCAGGCC  
GCCAGGAGGCCGTGGACAAGCTGATTGCCGTGGCTTCGACCCGGTCTATGGCGACGCCGCTGAAGCGGG  
CGCTGGATCGAGAACCCGCTGGCGCAACTGATCCCTGGCCGGAAATTGCGCCGGTGCAGTATCTGCC  
AGGCACGAGATCGTCTCGCCTGA

Figure 57

FIGURE 58

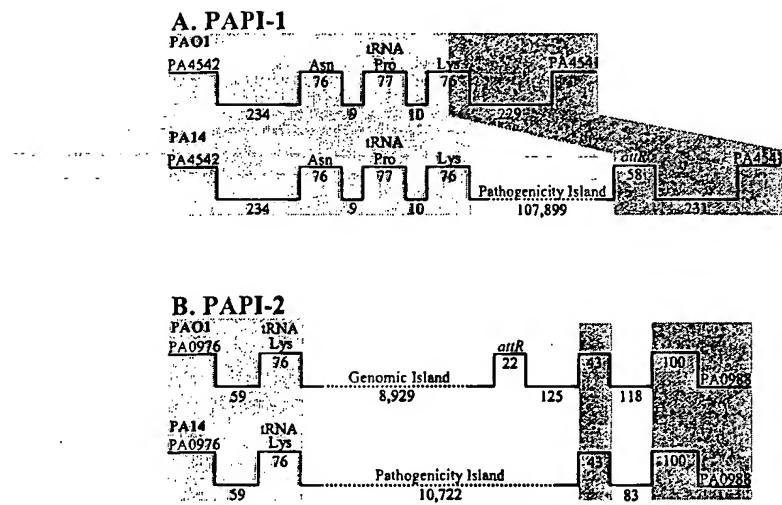


Figure 59

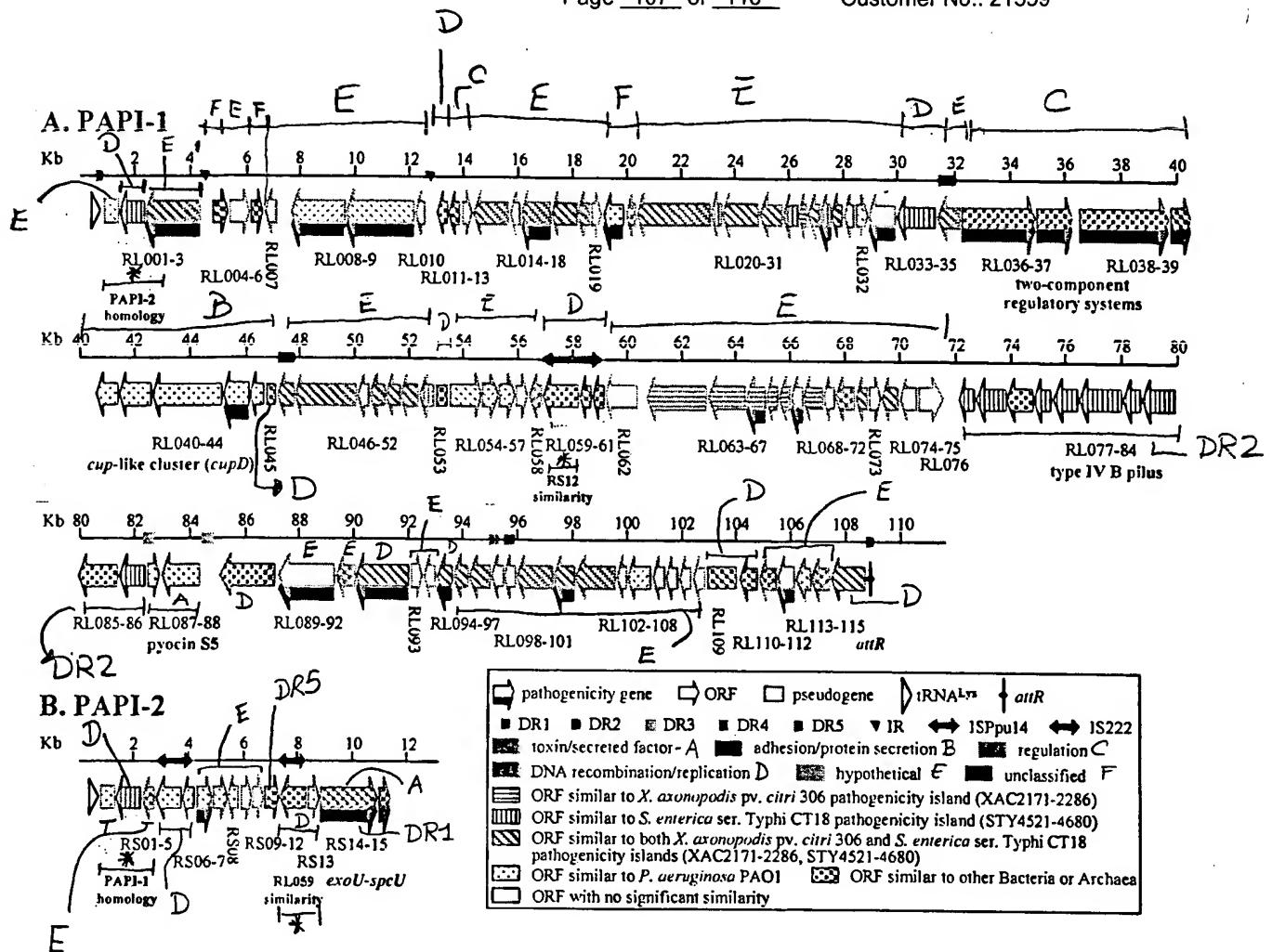


Figure 60

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
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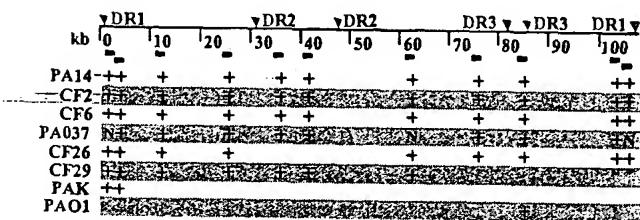
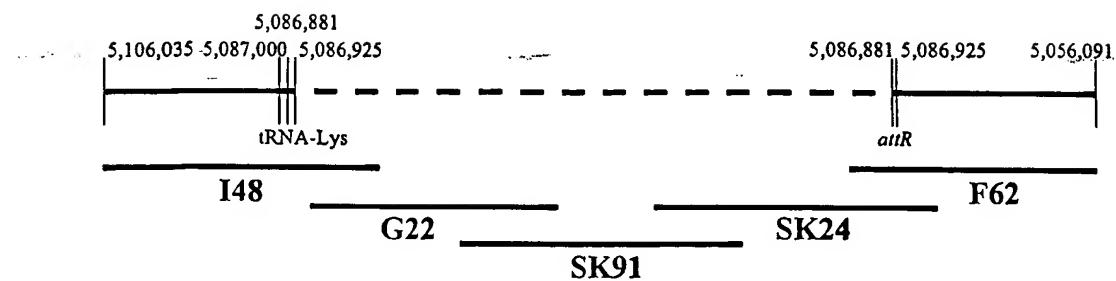


Figure 61

**A. PAPI-1**



**B. PAPI-2**

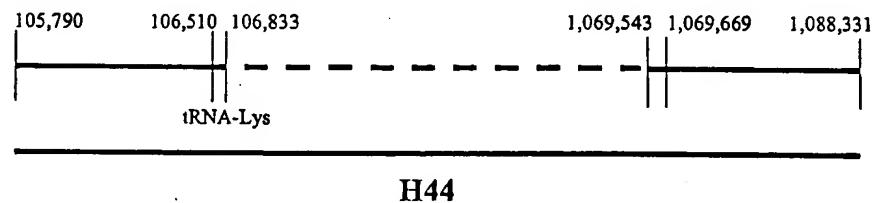


Figure 62

**FIGURE 63**

Strain name*	% Mouse mortality†	Growth in <i>Arabidopsis</i> leaf‡	Closest published homologue (organism / GenBank accession no.)
PA14	100	$4.9 \times 10^6$	
RL003§	41	$2.3 \times 10^5$	<i>P. syringae</i> pv. <i>tomato</i> DC3000 / AAO54371
RL008	38	$4.1 \times 10^6$	<i>M. acetivorans</i> C2A / AAM05538 and <i>P. aeruginosa</i> PAO1 / AAG05323
RL009	31	$1.3 \times 10^4$	<i>P. aeruginosa</i> PAO1 / AAG05327
RL016	100	$2.8 \times 10^4$	<i>P. syringae</i> pv. <i>tomato</i> DC3000 / AAO54383
RL020	50	$3.4 \times 10^5$	protein-disulfide isomerase, <i>P. aeruginosa</i> PAO1 / AAG04371
RL022	88	$3.3 \times 10^6$	<i>P. syringae</i> pv. <i>tomato</i> DC3000 / AAO54394
RL029	38	$9.4 \times 10^4$	<i>P. aeruginosa</i> C / AAN62148
RL033	25	$4.9 \times 10^4$	no significant similarity
RL036	44	$1.9 \times 10^5$	two-component sensor <i>P. aeruginosa</i> PA14 / AAM15532
RL037	43	$1.2 \times 10^5$	two-component regulator <i>pvrR</i> , <i>P. aeruginosa</i> PA14 AAM15533
RL038	31	$4.4 \times 10^4$	two-component sensor <i>rcsC</i> , <i>S. typhimurium</i> LT2 / AAL21172
RL039	31	$2.7 \times 10^5$	two-component regulator <i>rcsB</i> , <i>E. coli</i> O157:H7 EDL933 / AAG57352
RL043	75	$1.7 \times 10^6$	probable pili assembly chaperone <i>cupA2</i> , <i>P. aeruginosa</i> PAO1 / AAG05517
RL054	63	NT†	<i>P. aeruginosa</i> PAO1 / AAG05610
RL062	78	NT†	no significant similarity
RL065	63	$4.5 \times 10^5$	<i>X. axonopodis</i> pv. <i>citri</i> 306 / AAM37094
RL068	56	$2.6 \times 10^5$	no significant similarity
RL090	67	$2.7 \times 10^4$	no significant similarity
RL092	0	$1.3 \times 10^5$	topoisomerase I TopA, <i>X. fastidiosa</i> 9a5c (plasmid pXF51) / AAF85572
RL095	50	$5.3 \times 10^5$	single-stranded DNA binding protein Ssb, <i>P. aeruginosa</i> C / AAN62318
RL101	38	$1.8 \times 10^6$	<i>Pseudomonas</i> sp. B13 / CAD60668
RL112	38	$1.6 \times 10^4$	no significant similarity
RS06	100	$1.8 \times 10^5$	<i>P. aeruginosa</i> PAO1 / AAG04369

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	Positions	Length (bp)	Number of identical bp	Genes between the repeats
DR1	744-805 108,700-108,762	63	59	PAPH1 (108 kD)
DR2	31,587-32,248 47,100-47,761	662	654	two component regulatory systems and <i>cup</i> -like cluster ( <i>cupD</i> )
DR3	82,574-82,821 85,296-85,540	248	235	phiocin S5 and associated immunity protein
DR4	95,301-95,357 95,358-95,414	57	50	none
DR5	95,767-95,824 95,825-95,881	58	54	none
IR	4,527-4,594 12,825-12,892	68	56	pathogenicity genes and Archaea homologous genes

FIGURE 64

Title: VIRULENCE-ASSOCIATED NUCLEIC ACIDS AND  
PROTEINS AND USES THEREOF  
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IS name	PAPI-1		PAPI-2		Characteristics of IS	
	Position	Length (bp)	Position	Length (bp)	Original length (bp)	IS family
ISPPu14	56,778-59,119	2,341	7,034-7,999	966	2,383	IS66
IS222	-	-	2,980-4,201	1,222	1,232	IS3

FIGURE 65

FIGURE 66

Function	Prototype name	Type IVB (PAPI-1 in PA14)	Type IVA (PAO1)	Xcp (PAO1)	Hxc (PAO1)	Hpl (PAO1)	Other homologues in PAO1 genome
ATPase	<i>pulE</i>	RL082 ( <i>pilQ2</i> )	<i>pilB</i>	<i>xcpR</i>	<i>hxcR</i>	<i>hplR</i>	<i>xvba</i> , <i>xvba</i>
			<i>pilT</i>				
			<i>pilU</i>				
Peptidase	<i>pulO</i>	RL079 ( <i>pilT2</i> )?	<i>pilD</i>	<i>pilD</i>	<i>pilD</i>	<i>pilD?</i>	
Major pilin	<i>pulG</i>	RL080 ( <i>pilS2</i> )	<i>pilA</i>	<i>xcpI</i>	<i>hxcI</i>	<i>hplI</i>	
Minor pilin	<i>pulH</i>	RL077 ( <i>pilM2</i> )	<i>pilE</i>	<i>xcpU</i>	<i>hxcU</i>	<i>hplU</i>	
	<i>pulI</i>	RL078 ( <i>pilV2</i> )	<i>fimU</i>	<i>xcpV</i>	<i>hxcV</i>	<i>hplV</i>	
	<i>pulJ</i>	RL083 ( <i>pilP2</i> )	<i>fimT</i>	<i>xcpW</i>	<i>hxcW</i>	<i>hplW</i>	
	<i>pulK</i>	RL086 ( <i>pilL2</i> )		<i>xcpX</i>	<i>hxcX</i>	<i>hplX</i>	
Inner membrane protein	<i>pulF</i>	RL081 ( <i>pilR2</i> )	<i>pilC</i>	<i>xcpS</i>	<i>hxcS</i>	<i>hplS</i>	<i>xqhA</i>
	<i>PulC</i>	RL084 ( <i>pilO2</i> )		<i>xcpP</i>	<i>hxcP</i>		
	<i>PulB</i>			<i>xcpY</i>	<i>hxcY</i>		
	<i>pulM</i>			<i>xcpZ</i>	<i>hxcZ</i>		
Secretin	<i>pulD</i>	RL085 ( <i>pilN2</i> )	<i>pilQ</i>	<i>xcpQ</i>	<i>hxcQ</i>		<i>xqhA</i> , <i>xqhB</i> , <i>xqhC</i>

**FIGURE 67**

**ORF 7 (SEQ ID NO: 280)**

LEFGSATWTRTRDPMINSHLLYRLSYRGTSFFQPWTLPVLLDSRLRGAPFYGCARACQPSDPKSFSSFSTS DKTALPLHAAALSLR PDAHEKAPPKR  
5 GPPCP PPPKRSGEDDLVAFHLLRDTGTRREFAGQDQLRQVRVLDPALDGPLQRACAI DRVEADGNQLVQRLLAQFQAQLALGQALQAT ELDI GDAGDL  
LASQRLEHHHHFVDPVDEFRT ETRVHCGTLRAVAGQQLLDRRTEVGGHHHHGVAEVHRTPTVQGQASVLEHLEENVEYIRMGLLHLVQQHHRV  
GLAADRLGQVAAFLEADVARRRAQAGH RFLHELGHIYPHORLLGIEEEELQRLAQLGLAHPGRAEEEERAARPVRIGEAGARTAHGVGHGDYRLV  
10 LADHS PMQLLLAQQLLALALEHLRHD TGPLGNHFGD FLVGH LVQA QL VLGAVLVDH LQAFQVRDGLVLDARH ALEVALAPRRLHLLLGLLDLL  
LDLRRALHGLLGLPDLLEVGVFALELD DILLQ LGQALPGGFVFLQLQRLALDQLDQATVETI QFLRLGVDLHADAAGGLVDQVDGLV RQLPIDGV  
AVRQLGRGDDRAVGDAHPVVFIAFLEATEDGDGVFLARFVHQHLL EAAALQRGIL LDVLA LVEGSSTD A VQLA RQS RLEHVAGVHGTFRLAGADH  
GVFQVDEQDDPAFLLAQFVEDRLQAFLEAAELGTGDQRPHVQGQQALVLEAVRHFAVDDALGQALDDGGLADAGFADQH RVVLGPP LQDLDGPADL  
VVATDHRV E LAFLGALGHVDGV LVQRLARLLDVRV VHFRAATQVGHGILQRLARH A LAEQQLAEPGVLVH RGQQYQLAGDELV ALLLQGA VSLVEQA  
CEILGQVHVAGR ALDLRQ RVEFF VEEAAAQGGDIEADLHQG QLDR TALL LEQGGKQVHRLDGRMVMANGQGLGVGERQLQLAGQT VYSHGSSFL

15 ORF7 (SEQ ID NO: 281)  
TTGGAATTTGGCTCCGCACCTGGACTCGAACCCAGGGACCCAATGATTAACAGTCATTGCTCTACCGACTGAGCTATCGCGAACGTCTTCTTCC  
AACCTGGACGCTTCCGGTTGCTGGATTCAGCGCCTACCGATGCGCAGCCTCTCGCGCTACCGGACGCCATGAAAAGCCCCGCCAGCGG  
20 GGCTTCCCTGTCCGCCCGAAGAGGTCAAGCGAAGACATCTGCTCGGCTTCCACCTCGGAGATACTGGCACCCGGCGAATTGCGGCC  
AGGATCAGTTGCGCCAGCGGGTTCTCGATCCAGCTCGGCTTCCAGGCTCAGCTCGCGCTCGGCAGCGCAGCTGGGATCGAAGCCGACGCAATCAGCT  
TGCCAGCGCCCTCTGGCTCAGTCCAGGCTCAGCTCGCGCTCGGCAGCGCAGCTGGGATCTCGGCGATGCCGGATCTGGCGACGT  
CTCGCGAGCGCAGCGGCTCAACACCACCTCGTCGATCCGGTTGATGAATTCCGGACGGAGTTCGCGCATGACCGCGTCCATCAGTCCGGCACGT  
25 TGCGCCTCGCGTCGCGCCAGCTCTGGATCTGCGCGAACCGAGGGTTGAGGTCAATCACCAACCGTGTGCGGAAGTCCACCGTACCGCC  
GACTGTCGGTCAGCGTCCCTGAGCACCTGGAGGAGAATGTTGAATACATCCGGATGGGCTTCTCCACCTCGTCCAGCAGCACCCAGAGTA  
GGGCTTGC GGATCGCCTCGTCAGGTAGCGCCTTCTCGAAGCGACGTAGCCGGAGGGCGCCGATCAGCGGGCCACCGAGTGTTC  
30 ATGAAC TCGGACATATCTCGCACCAGCGCTCTCGGTATCGAAGAGGAAC TCGG CAGCGCCTTGACAACTCGGTCTTGCCACCCGGTCG  
GGCGAGGAAGAGGAACGAGCGCTCGGGCGTTCGGATCGCGAGGGCCGCGCGAACGGCGACCGCGTGGACACGGGACTACCGCCCTCGTC  
CTGGCCGATCAGTCCGCTCTGGCTTCTCGGAGCAGCTCTCGGCTCTCGGCGTCAAGCTTCCGACACGGGATACCGGTTCAACTTG  
GAAACCACTCGCGATTTCTCGTCGGTCACTTGTGCGCAGCACTGGTCTCGGCTTCTCGGAGCTTCTCGGCTCTCGGCGTGGACCATCTG  
35 GTCGGGGATGGTCTGGTACTGGATGCGGCCATGCTCTCGAGGTGCGCCCTCTCGGACTTCCAGATCTCTCGGAGGTGCGCTTCTCGGCT  
CTGGATCTCGCCGAGCCCTGACCTCGGCTTCTCGGACTTCCAGATCTCTCGGAGGTGCGCTTCTCGGAGCTTCTCGGCTCTCGGCT  
AGCTTGGCAGCGCCTCTGGTGGCTTCGTCGTTCTCTCTCGGCTCTCGGCTCGATCTCAGCTGGATCAGCGACGGTCGAGACGATCCA  
GTCTCCCGGCTTGGAGTCGATCTCATCGGATGCGCTGGCGCTCTCGGCTCGATCAGGTGAGTGGCTTGTGCGAGTGGCGATCGGTGATGTA  
40 GCGGTGCGACAGCTTGGCCGGCGATGATCGGCCGCGTGGTATGTCACCCCGTGGTCACTTCAGCTTCTCGGCTTCTCGGCTTCTCGGCT  
ATGGGTGTCCTCTCGCTGGTCCACCCAGCACCTTCTGGAAAGCGCGCTCAGCGCGCATCTTCTCGGATGTACTGGGAGTACTCGTC  
TAGTAGCACCGACGCAGTCAGCTCGCCCGCGCAGAGCGGGCTTGGAGCATGTTGCGGGCTCATGGCACCTTCCGCTTGGCGCCGACCAT  
GGTGTGCA GTTCTCGGCTCGATGAAACAGGATGACCCGGCTTCTCGTCTGGCCAGTTCTGTTGAGGACCGCCTTCA CGGCGTTCTCGA  
45 ACTCGCCGGAACTCGCCGGATCAGCGCCGGCTTCTCGGCTCGGAGATGAACTGGTCGCCCTTCTGCTGGGCGTGGCTTCTCGGAGGCG  
TTGGCACCGGCGATCAGCGCCGGCTTCTCGGCTCGGAGAGCGCCGGCTTCTCGGCTCGGAGATGATGCGCTGGCCAGGC  
CCTCGACGATGGCGGTCTTGGCGACGCCGGTTCTCGCCGATCAGCACCGGGTTGTTCTTGGTCCGCCGCTGCGAGCACCTGGATGGTCC  
GCGGATCTCAGCTCGGCTTCTCGGCTCGGAGCTTGGGCTTCTCGGCTCGGAGCTTCTCGGCTCGGAGCTTCTCGGAGGCG  
CTCGTCTCGGAGCTTGGGCTTCTCGGCTCGGAGCTTGGGCTTCTCGGCTCGGAGCTTCTCGGCTCGGAGCTTCTCGGAGGCG  
TGGTGTCTCGGCTTCTCGGCTCGGAGCTTGGGCTTCTCGGCTCGGAGCTTGGGCTTCTCGGCTCGGAGCTTCTCGGCTCGGAGGCG  
TGGGAGATCTGGGACAGCTTCACGTCCGGCTCGGAGCTTGGGCTTCTCGGCTCGGAGCTTGGGCTTCTCGGCTCGGAGCTTGGGCT  
TCGAAGCCGACCTGCATCAGCAGGGGCTTGTGATCGAACC CGCTTGTGCTCGAGCAGGGCGAAAGCAGGTGACCCGGCTCGATGG  
GGCCAA CGGCAGGGACTGGCGTCGGAGAGCGCCAGTTGAGCTTGTGCTGGTCAAACGGTCTATCGCATGGGCTGCTTCTCTATAG

FIGURE 68 (SEQ ID NO: 121)

5 ACGTCGGGGCGCATTTGctACGCCTGcaGAAGGTTTCAGGGCTTAGAAACAGAAAAGCCCACGAC  
AGGCGGGCTATTCCATATTGACATCACGTCAATGCGGGCTAATGTTGGCCCAGACGGCTGCTAGACAA  
GAACCGGCGTAACACCCCTCCTAGCCTATGCAACTCGCCCCGTAGAAAATGGTGGGTGCTGTAGGATT  
GAACCTACGACCAATTGGTTAAAAGCCAACTGCTTACCGACTGAGCTAACGACCCAAAGTATGAGGTGGT  
CGGGGTAGAGAGATTCGAACTCCCGACATCCTGCTCCAAAGCAGGCGCGTACCGACTCGCTATACC  
CCGATTGGAATTGGCTCCGCGACCTGGACTCGAACCAGGACCCATG

FIGURE 69

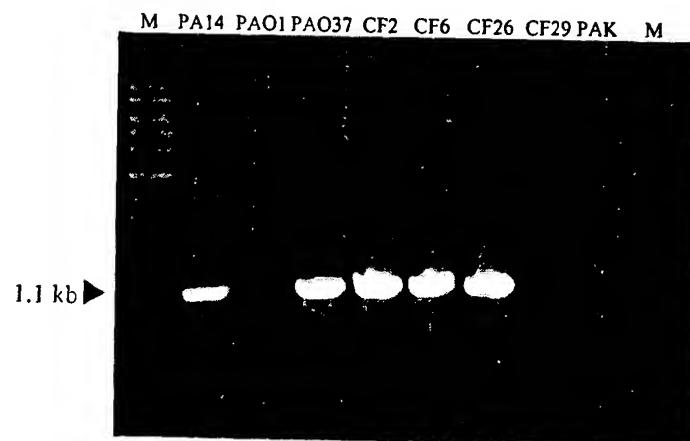


FIGURE 70A

CLUSTAL W (1.82) multiple sequence alignment

CF2 (SEQ ID NO: 122)	-----GATGAAGG-ACCCGAGCGGAACATCCATCTCAC	32
PAO37 (SEQ ID NO: 123)	-----GATGAAGG-ACCCGAGCGGAACATCCATCTCAC	32
CF6 (SEQ ID NO: 124)	-----GATGAAGGACCCGAGCGGAACATCCACCTCAC	33
PA14 (SEQ ID NO: 125)	TTTCCGGCACACCCCTGGCCACCGACTTGTATGAGGCACCCGAGCGGAACATTCACCTCAC	60
CF26 (SEQ ID NO: 126)	-----GATGAAGG-ACCCGAGCGGAACATCCACCTCAC	32
*****		
CF2	CAAGTGCCTGCTCAACCCTCGAATATCCAGACCACCATGAGCTACATCGAGGCCGACTA	92
PAO37	GAAGTGCCTGCTCAACCCTCGAATATCCAGACCACCATGAGCTACATCGAGGCCGACTA	92
CF6	GAAGTGCCTGCTCAACCCTCGAATATCCAGACCACCATGAGCTACATCGAGGCCGACTA	93
PA14	GAAGTGCCTGCTCAACCCTCGAATATCCAGACCACGATGAGCTACATCGAGGCCGACTA	120
CF26	GAAGTGCCTGCTCAACCCTCGAATATCCAGACCACGATGAGCTACATCGAGGCCGACTA	92
*****		
CF2	CGACCACATGCGTGCCTGCTGCATGCCAGAACGCTGGCCAAGGAGCGCTGGAGAACGT	152
PAO37	CGACCACATGCGTGCCTGCTGCATGCCAGAACGCTGGCCAAGGAGCGCTGGAGAACGT	152
CF6	CGACCACATGCGTGCCTGCTGCATGCCAGAACGCTGGCCAAGGAGCGCTGGAGAACGT	153
PA14	CGATCACATGCGTGCCTGCTGCATGCTAGAACGCTGGCCAAGGCGCCTGGAGAACATGT	180
CF26	CGATCACATGCGTGCCTGCTGCATGCTAGAACGCTGGCCAAGGCGCCTGGAGAACATGT	152
*****		
CF2	CAGGAAGGTGGATTACAGCGGCTCCCGCAAGCCTCTGCCAACCGAAGCCATGCGGC	212
PAO37	CAGGAAGGTGGATTACAGCGGCTCCCGCAAGCCTCTGCCAACCGAAGCCATGCGGC	212
CF6	CAGGAAGGTGGATTACAGCGGCTCCCGCAAGCCTCTGCCAACCGAAGCCATGCGGC	213
PA14	CAGGAAGGTGGATTACAGCGGCTCCCGCAAGCCTCTGCCAACCGAAGCCATGCGGC	240
CF26	CAGGAAGGTGGATTACAGCGGCTCCCGCAAGCCTCTGCCAACCGAACCCATGCGGC	212
*****		
CF2	ACCTCTCGCTCGAATGGGTGAAGTACCGCCGCGGAGGCCAGGACAGAACCTGCAGAAC	272
PAO37	ACCTCTCGCTCGAATGGGTGAAGTACCGCCGCGGAGGCCAGGACAGAACCTGCAGAAC	272
CF6	ACCTCTCGCTCGAATGGGTGAAGTACCGCCGCGGAGGCCAGGACAGAACCTGCAGAAC	273
PA14	ACCTCTCGCTCGAAGTGAAGGCCACCGGAGGCCAGGACAGAACCTGCAGAAC	300
CF26	ACCTCTCGCTCGAAGTGAAGGCCACCGGAGGCCAGGACAGAACCTGCAGAAC	272
*****		
CF2	AAGGGAGCACATACCAGGGACAGGCATTCAAGGGAGGTCCAACCGTGGGGAAAGAAG--C	329
PAO37	AAGGGAGCACATACCAGGGACAGGCATTCAAGGGAGGTCCAACCGTGGGGAAAGAAG--C	329
CF6	AAGGGAGCACACACCAGGGACAGGCATTCAAGGGAGGTCCAACCGTGGGGAAAGAAG--C	330
PA14	AAGGGAGCACAGCCAGGGACAGGCATTCAAGGGAGGTCCAACCGTGGGGAAAGCAGATGC	360
CF26	AAGGGAGCACACACCAGGGACAGGCATTCAAGGGAGGTCCAACCGAGTGGGAAGCAGAAC	332
*****		
CF2	GCTACCACAGCCACCTGACACCTTCGACCAAAGCGTGTGTTCACTCTGATGGCTCAACA	389
PAO37	GCTACCACAGCCACCTGACACCTTCGACCAAAGCGTGTGTTCACTCTGATGGCTCAACA	389
CF6	GCTACCACAGCCACCTGACACCTTCGACCAAAGCGTGTGTTCACTCTGATGGCTCAACA	390
PA14	GCTACCACAGCCACCTGACACCTTCGACCAAAGCGTGTGTTCACTCTGATGGCTCAAAA	420
CF26	GCTACCACAGCCACCTGACACCTTCGAGCAAAGCGTGTGTTCACTCTGATGGCTCAACA	392
*****		
CF2	CTTATCGAACCGTGCCTCGGCATCCGGCTCCCGTGCACAAAGCGGATCTGGTGG	449
PAO37	CTTATCGAACCGTGCCTCGGCATCCGGCTCCCGTGCACAAAGCGGATCTGGTGG	449
CF6	CTTATCGAACCGTGCCTCGGCATCCGGCTCCCGTGCACAAAGCGGATCTGGTGG	450
PA14	CTTATCGAACCGTGCCTCGGCATCCGGCTCCCGTGCACAAAGCGGATCAGCGG	480
CF26	CTTATCGAACCGTGCCTCGGCATCCGGCTCCCGTGCACAAAGCGGATCTGGTGG	452
*****		
CF2	ATGGGGATCTACTGCCCGAAGCAGTCTCGCCTAGCGATACCGATACTGAAGGGCCGGCTA	509
PAO37	ATGGGGATCTACTGCCCGAAGCAGTCTCGCCTAGCGATACCGATACTGAAGGGCCGGCTA	509
CF6	ATGGGGATCTACCGCCCGAAGCAGTCTCGCCTAGCGATACCGGTACTGAAGGGCCGGCTA	510
PA14	ATGGGGATCTGCCCGCCGAAGCAATCTGCCCTAGCGATACCGGTACTGA-GGGCCGGCTA	539
CF26	ATGGGGATCTGCCCGCCGAAGCAGCGCCTCGCTAGCGATACCGGTACTGAAGGGCCGGCTA	512
*****		

FIGURE 70B

CF2	CCGGACGAAAGGTAGCCGCCCTCCCAGCAGTCAGGCTGTAAGAAAAATCTGGAA	569
PAO37	CCGGACGAAAGGTAGCCGCCCTCCCAGCAGTCAGGCTGTAAGAAAAATCTGGAA	569
CF6	CCGGACGAAAGGTAGCCGCCCTCCCAGCAGTCAGGCTGTAAGAAAAATCTGGAA	570
PA14	CCGGACGAAAGGTAGCCGCCCTCCCAGCAGATCGTAGGCTGTAAGAAAAATCTGGAA	599
CF26	CCAGACGAAAGGTAGCCGCCCTCCCAGCAGATCGCTGGGCTGTAAGAAAAATCTGGAA	572
*****		
CF2	TTACCGAGAGGCCCTGGATTCCAGCGCCGGCATGCTGGCAGAGCCC-CGCAGTTTCACGG	628
PAO37	TTACCGAGAGGCCCTGGATTCCAGCGCCGGCATGCTGGCAGAGCCC-CGCAGTTTCACGG	628
CF6	TTACCGAGAGGCCCTGGATTCCAGCGCCGGCATGCTGGCAGGGCCC-CGCAATTTCAGG	629
PA14	TTACCGAGAGGCCCTGGATTCCAGCGCCGGCATGCTGGCAGAGGCCAGCGAATTTCAGG	659
CF26	TTACCGAGAGGCCCTGGATTCCAGCGCCGGCATGCTGGCAGAGCCC-CGCAATTTCACGG	631
*****		
CF2	CCAAAACCCGAGTACCCCTCTGTAATCGCTGATTACGTCGGGGCGCATTGCTACGCCCTGC	688
PAO37	CCAAAACCCGAGTACCCCTCTGTAATCGCTGATTACGTCGGGGCGCATTGCTACGCCCTGC	688
CF6	C-GAAACCCGAGTACCCCTCTGTAATCGCTGATTACGTCGGGGCACATTGCTACGCCCTGC	688
PA14	CCAATACACAGTACCCCTCTGTAATCGCTGATTACGTCGGGGCGCATTGCTACGCCCTGC	719
CF26	C-AAAACCCGAGTACCCCTCTGTAATCGCTGATTACGTCGGGGCGCATTGCTACGCCCTGC	690
*****		
CF2	AGAA-TGGTTTCAGGGCCTTANAAACAGAAAAGCCCACCTTAAATAGGCGGGCTATT-CC	746
PAO37	AGAAATGGTTTCAGGGCCTTAGAAACAGAAAAGCCCACCTTAAATAGGCGGGCTATT-CC	747
CF6	AGAA-TGGTTTCAGAGCCT-GAAAACAGAAAAGNCCACC-TAAATAGGCGGGCTATTCC	745
PA14	AGAA-TGGTTTCAGGGCCTTAGAAACAGAAAAGCCCACC-TAGAAAGGCGGGCTATT-CC	776
CF26	AGAA-TGGTTTCAGAGCCTTANAAACAGAAAAGCCCACC-TAGATAGGCGGGCTATT-CC	747
*****		
CF2	ATATT-GACATCACG-TCAATGCGGG--CCTAATGTTG--GGCCCAAGACGGCTG--CTGG	798
PAO37	ATATT-GACATCACG-TCAATGCGGG--CCTAATGTTG--GGCCCANACGGCTG--CTGG	799
CF6	ATATTGACATCCCG-TCAATGCGGGGCCCTAATGGTTCGGGCCCANACGGCTTGCTTGG	804
PA14	ATATT-GACATCACG-TCAATGCGGG--CCTAATGTTG--GGCCCAAGACGGCTG--CTAG	828
CF26	ATATT-GACATCACGGCAATGCGGG--GCTAATGTTG-GGGCCCANACGGNTG--CAA	800
*****		